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MARCH 1984 THE NAVAL AVIATION SAFETY REVIEW

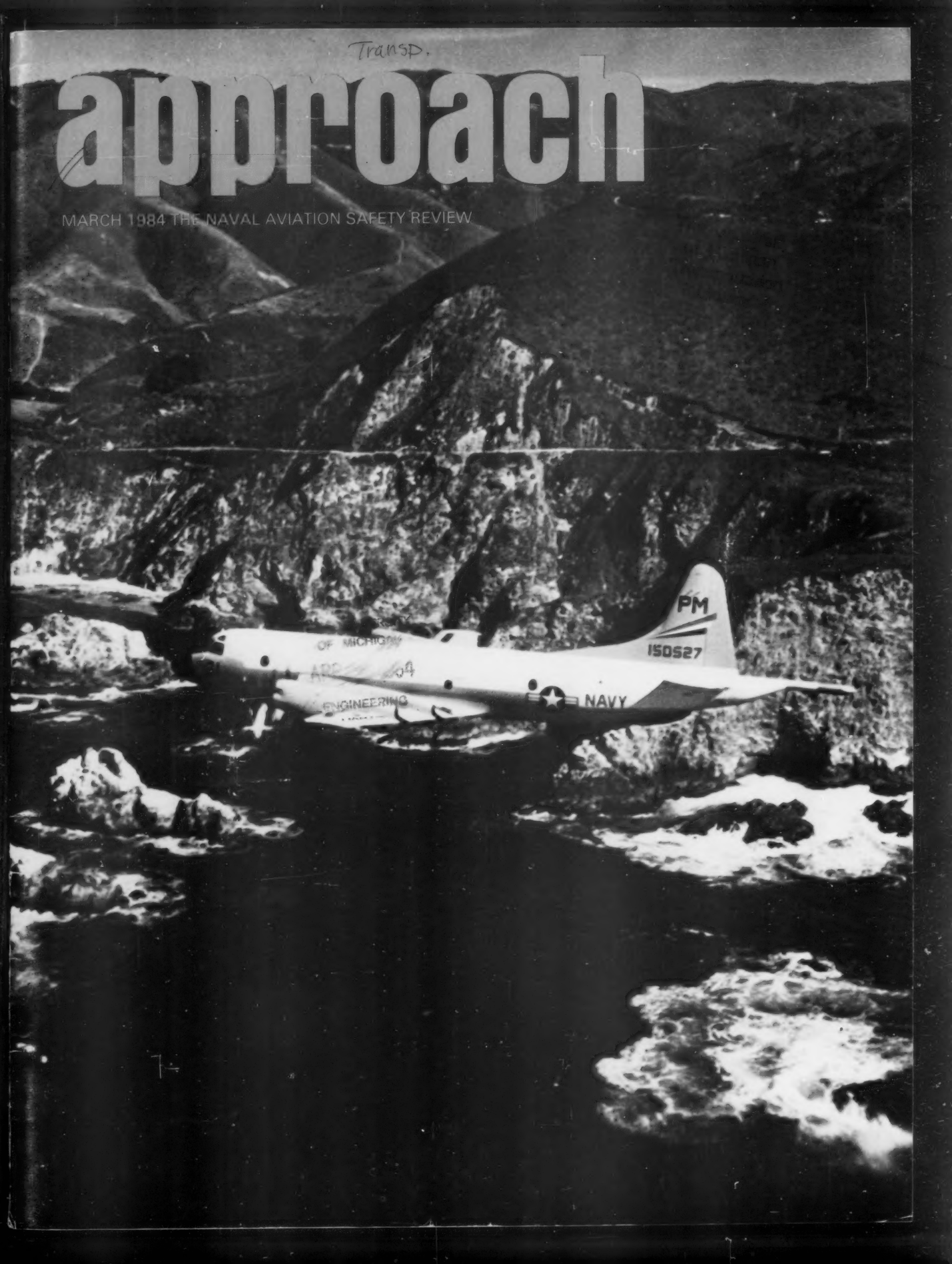

Photo by Lt. John Flynn

Combat Safety...

... is not an inherent contradiction, although we treat it as one. The threat of facing a real enemy tends to overshadow the dangers inherent in this business of aviation that are indifferent to war and peace. Simply put, "When yer gettin' shot at, ya forget about the rulebook." That sounds like common sense, but is it really good headwork? Consider this: Even during the height of the Vietnam war, we lost more aircraft to Class A mishaps than to DEA (direct enemy action). Accident rates tend to shoot up, even in training environments, when there is even threat of conflict anywhere on the globe. We saw the rate nearly double during the first months of the Cuban missile crisis, the Iranian crisis and during the current tensions. This has been called "The Emergency Deployment Syndrome." The probable causes are debatable and certainly complex. But one thing is obvious: We can't afford to be accidentally shooting ourselves in the collective foot on the way into battle. Part of the problem may be a lack of communication about combat safety topics.

The Safety Center is going to deal with this problem in a new magazine. We are currently accepting articles from all communities, land, sea and air, which pass on philosophy, training ideas and lessons learned about the combat environment. First-hand accounts from veterans are needed, but so are well thought out inputs from anyone who takes his mission seriously. The first issue will come out in June 1984. With support from its readership, Combat Safety will become a valuable professional forum for the naval fighting man.

Lt. John Flynn
Editor

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On 3 February 1984, my active association with the Navy came to an end after 41 years. What follows are some of my experiences during those years.

My Final Approach

By Russ Forbush
Approach Writer

ON 6 January 1943, several hundred naval aviation cadets gathered at North Station in Boston, Mass. to begin active naval service. I was one of them. The train we were to board was to transport us to Williams College in Williamstown, Mass., where we would be the first of several contingents to spend about five months undergoing pre-preflight training. In the late spring of 1942, the Navy had begun allowing high school graduates to apply for the Naval Aviation Cadet, V-5 Program (the previous requirement had called for a minimum of two years of college). The pre-preflight program was designed to provide us high school grads with the equivalent of one year of college. Little did I realize during that joyous trip to Williamstown, however, just how close I would come to washing out of the program right there at Williams.

I knew when Dr. Clapp entered the classroom that physics would be my nemesis. There he stood, tall and gaunt, a replica of Ichabod Crane, attired in the typical college professor attire of that era — a baggy and rumpled tweed suit. After a short, terse introduction, he commenced writing on the blackboard. He started at the far lefthand side and swiftly worked his way to the far righthand side. Back and forth, back and forth he went, throughout the one-hour period. The windows in this ancient classroom rose from floor to ceiling and one was located adjacent to the right side of the blackboard. It looked as though he would scribble himself right out through that window at the end of each cycle. I was still copying from the blackboard several minutes after the class ended. The course was college physics, and since I had not taken college preparatory physics in high school, what was written in my notebook made absolutely no sense to me.

The author (far left center) and group entrain for Williams College.

At the end of the first week Dr. Clapp gave us a quiz. My score tallied .8 on a 4.0 scale. The only reason I got a .8 was because the quiz was multiple-choice and I was able to guess a few correct answers. At the end of the second week another quiz was administered. I was real good at guessing on this one and posted a 1.3. This is it, I thought to myself — no way am I going to pass this course without help. Never in my life had I wanted to accomplish something as much as I did becoming a naval aviator. From the time I was a young boy, I had watched the PBYs and other naval aircraft take off and land at NAS Squantum, Mass., which was near my home. It was beyond my wildest dream that one day the Navy would offer me the opportunity to enter the naval flight program.

I remember the day back in June 1942 when I first heard the announcement over the radio that the Navy was opening up the program to high school grads. It was 0630 and I was on my way to work. I told the driver of the carpool to pull over and let me out of the car. He was somewhat astounded but did as I asked. I thumbed a ride back home, changed clothes and made my way via public transportation to 120 Causeway St. in Boston where the physical and mental exams were being given. I couldn't believe it when I was informed several hours later that I met all the requirements to become a naval aviation cadet. I was sworn into the Navy on 11 September 1942. I just couldn't muff this opportunity of a lifetime — somehow I had to find a way to pass my physics course. I wasn't having trouble with other courses, only physics.

After failing the second quiz, I approached Dr. Clapp and asked him if there was any way I could learn enough about the course to pass it. He grunted something I didn't understand and then said he would talk to me on the following Monday. He didn't forget. Before class, he pulled me to one side and said that he had checked my academic record and found that my grades in all other subjects were well above average. In view of this, he offered to tutor me each afternoon during my study hour. He also provided me with additional physics reference books to study. Needless to say, I was elated.

The first week of tutoring was a nightmare. Dr. Clapp was so frustrated with my inability to grasp the theory of physics, I thought he was going to blow his mind. He contained himself, however, and we proceeded into the second week. Things improved somewhat, but I was still trying to find answers to questions without first determining the theory behind them. Finally, during the end of the third week, Dr. Clapp again presented me with a problem and, somehow, the haze lifted and I was able to come up with the right answer. The professor's eyes looked like double zeros as he blurted out "By God, Forbush, I think you've got it." Geez, I felt like a Pygmalion clone. I was able to hang in there for the rest of the course and passed with a 2.7. To me it was a 4.0. Without Dr. Clapp's assistance, college physics I would have been my undoing. This episode proved one thing to me — if you want something badly enough and you need help to get it, ask for it. Had I not done so, my aspirations of becoming a naval aviator would have died before I ever flew an aircraft. Dr. Clapp, thank you again, wherever you are.

The Navy knew what it was doing when it provided the pre-preflight college training program for high school grads. We were schooled in physics, advanced math, aerodynamics, navigation (including celestial), electricity, aircraft engines, aircraft systems, code, blinker, recognition, seamanship, military aptitude and physical fitness. The 75 percent of us who successfully completed the program would never need worry about future academic training — we were thoroughly prepared for it.

The next stop on our way to wings of gold took my group to Lenoir Rhyne College in Hickory, N.C. for CPT/WTS (Civilian Pilot Training/Wartime Training School) training. We would spend about three months undergoing flight and ground school training in either Piper Cub or Aeronca aircraft. Although we had a naval officer in charge, all training was conducted by civilian instructors. After the hectic training schedule at Williams College, our stay here was sheer luxury. The quarters were great, the food absolutely delicious, flying and ground school a joy and the coeds good-looking and plentiful. What more could a group of New England "Yankees" ask for? Our favorite song became "Nothing Could be Finer Than to be in Carolina in the Morning." We received 40 hours of flight training and the usual ground school courses associated with it. There were mixed emotions when it came time to move on to our next training base. Although we were looking forward to Preflight School at the University of Georgia, since it would be our first real association with the Navy, our pleasant stay at Lenoir Rhyne College was in everyone's mind the day the train pulled out of Hickory. Later, after the war ended and I was stationed at NAS Corpus Christi, Texas, I made it a point to periodically fly into Hickory to renew my old friendships.

I won't dwell on my stay at the University of Georgia except to say that upon my completion of training, I was in the best physical condition of my entire life. Then it was on to NAS Memphis, Tenn. for "E" Base (primary) training, where our group would get its first opportunity to be instructed by real live naval aviators.

By now it was late autumn and, gad, does it get cool and damp in Memphis at that time of year. This is especially true when you're flying an open cockpit N2S Stearman. Even winter flight suits and fleece lined boots didn't help much to keep the cold out. For the most part, the instructors were great guys, but we had the usual allotment of "downcheck Charlies" — you know, the guys who would rather be out fighting the war than instructing a bunch of wet-behind-the-ears naval aviation cadets in primary. But, who could blame them? There were few of us who made it through without getting at least one down from a "Charlie." Fortunately, I received only one automatic down from a "Charlie" and successfully completed training. I would now be on my way to Pensacola, "The Annapolis of the Air," for the final phases of training.

In late January 1944, following some leave, I arrived at NAS Saufley Field to commence basic training in the Vultee Vibrator. This was a real step up. For the first time, I was to pilot an aircraft with a canopy and what looked like a mass of flight and engine instruments. Man, with the flying helmet and goggles, flowing white flight scarf and leather gloves and flight jacket, I likened myself to "Butch" O'Hare and "Pappy" Boyington, soaring into combat in the Pacific. Fortunately, I was once again able to meet all the requirements and progressed on to NAS Whiting Field for instrument training in the SNJ.

During instrument training, the instructor pilots manned the front cockpit and the student the rear. All takeoffs and landings were made by the instructors. I can't remember any problems in this flight phase, although there probably were some. The last phase of training was now coming up. I had applied for multi-engine training (SNB aircraft) and was accepted. It was now on to the advanced training squadron, which was located on the other side of Whiting Field. I finished up my training in June and was commissioned an Ensign and designated a naval aviator on 1 July 1944. This was without a doubt the biggest thrill of my young life.

My orders called for me to report to NAS Lake City, Fla. to start operational training in the PV-1 Ventura. This aircraft was nicknamed the "Flying Prostitute" because it had no visible means of support (mighty short wingspan). I fell in love with the "Prostitute" because it was like flying a twin-engine fighter. It had great speed and good maneuverability, but was real tricky during landing. (You'll see what I mean later.) After finishing this training, it was on to NAS Beaufort, S.C. for gunnery training, something all of us were looking forward to.

On my third gunnery training flight at Beaufort, I nearly bought the farm for the instructor and myself. I was at the controls turning into final when I dropped the left wing too much and came back on the stick. Airspeed fell off rapidly as

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Being a naval aviator during WWII had its rewards.

The author and PV-1 Neptune crew during gunnery training at NAS Beaufort, S.C.

the bank increased. At this point, the instructor abruptly took over, gently brought up the left wing, added power and dropped the nose slightly to pickup airspeed. Thank heaven he took control in time to save us both from certain death. To say he was "ticked off" would be putting it mildly. I received the sternest tongue lashing I would ever get as a naval aviator. The man was 100 percent right. My head was rock bottom on that particular approach to a landing. It taught me a fundamental lesson though — when there's no reason to wrap up a bird, don't.

4 After completing gunnery training, 12 of us students were called into administration and told we had new orders to NAS Moffett Field for transition into PB4Y-1 (Liberator) aircraft. Seems like the Navy lost a lot of 4Ys recently in the Pacific and needed some new crews to join deployed squadrons. We were a bunch of bitterly disappointed naval aviators at this turn of events. All of us wanted to stay in the PV-1 but, for the first time, realized that, in the Navy, what you want is not always what you get. There was one consolation though — we'd have two more engines with which to work.

To state that flying the PB4Y-1 was akin to driving a tractor-trailer in the Indianapolis 500 would be a modicum of moderation. Unless you were an Atlas type, it took two guys on the pedals to make a turn, and a turn seemed to take forever. Thinking about flying in this "hearse" on low-level bombing missions in the Pacific caused me to develop several severe cases of heartburn. No wonder the Navy needed more crews. Getting the crate up and back down without busting one's butt was survival training. Perish the thought of having to do business with Japanese Zeros and other assorted enemy aircraft. Oh well, the Navy never promised me a rose garden. (Obviously, I was weeded out for better things.)

We finished our transition training in late December and were sent to Mare Island, San Franscisco to await transportation to Pearl Harbor. On 2 January 1945, we departed onboard a Navy transport and after arrival in Pearl Harbor, we boarded land transportation to NAS Kaneohe Bay where we would receive additional flight training, form crews, be assigned a PB4Y-1 and than TransPac to the South Pacific. In early March we commenced our trip to Tinian in the Marianas. Stops were made at Johnston Island and Eniwetok for rest and refueling prior to our arrival on Tinian, where we joined VPB-116.

It didn't take long for our crew to start operating. There were 11 of us in the crew — a PPC, two copilots/navigators, a crewchief mech, two other mechs, three gunners and two radiomen. Our squadron was flying dogleg sector search patrols to Japan, which was about 1,200 miles from Tinian. Our first flight to Japan was a "hummer." The bomb bay was loaded with aux fuel tanks and bombs. We found out then that these missions required us to take off with the PB4Y-1 several thousand pounds over max allowable gross weight. I was doing the navigating and was mighty apprehensive as the PPC commenced the takeoff roll. It seemed forever before we became airborne. The Liberator shook and groaned as we hugged the deck waiting for the airspeed to build up so that we could commence a climb. About 15 minutes later we were gaining altitude — and things began to look better. As I recall, this flight turned out to be rather uneventful. Our long range navigation (LORAN) gear worked effectively and on the way back to Tinian that night the stars were out in full force which made navigating a snap. We flew many of these missions before the Marines took Iwo Jima. After the island was secured, half of our squadron was sent there to fly sector searches to Japan. These flights were about half the distance we had been flying and this was a welcome relief. We spent two weeks on Iwo and then were relieved by the other half of the squadron for the next two weeks. We would continue this rotation on a regular basis. Since we were operating around the clock, each crew averaged over 100 flight-hours per two-week period. Going back to Tinian for rest and rehabilitation was like graduating from skid row to the Waldorf Astoria. It was tents, lava dust, sickening food and rodents on Iwo, while it was

The PB4Y-1 — It flew like a truck!

quonset huts, cots with mattresses and bedding, showers, clean uniforms and wardroom vittles on Tinian.

I'll never forget the last month before the war ended. When our sector searches brought us near the coast of Japan, we could see Allied ships of all kinds as far as our eyes could focus. What a magnificent sight. Never will there be anything like it again.

After the war ended we rotated between Tinian and Iwo until my crew was relieved in November 1945. The one thing I liked most about Pacific duty was being landbased and able to spend time on many of the islands Americans fought and died for to gain victory. It was now on to Honolulu and Waikiki Beach for a couple of weeks of frolicking in the sun and then on to San Francisco for more fun and games. I decided to stay in the Navy and requested orders to the Instrument Basic Training Unit at NAS Atlanta. Not having flown the airways for a year prompted me to make this request. I spent the Christmas Holidays on leave in Massachusetts and in January departed for Atlanta. I finished up the training and was ordered to NAS Corpus Christi for duty in the VM unit which was a "king of all trades" type of operation requiring that we fly several different types of aircraft. We transported VIPs, delivered mail, flew disbursing officers to outlying fields to pay the troops and, in my case, ferried PB4Y-2s to NAF Litchfield Park, Ariz. for mothballing, after they had been overhauled at NAS Corpus.

I was detailed to the ferry job because I was the only pilot qualified in the aircraft who also had a special instrument card. My early copilots and crews had never seen the inside of a Privateer. No NATOPS involved in this operation. I'll never forget one particular flight. I had a real green copilot on this one, along with six midshipmen who were trying to get to the West Coast. You all know how bright and sunny the weather is in summer around the Phoenix area. Well it decided to get nasty on this day. We were airborne between El Paso and Phoenix when I smelled hydraulic fluid. I looked around the cockpit but didn't see anything suspicious. When the smell persisted, I left my copilot at the controls with strict orders to keep the aircraft straight and level at the present altitude. I climbed down into the bow and saw that it was filled with hydraulic fluid. An elbow in the main hydraulic line had given way. This meant I could get my main landing gear down manually (I hoped), but the nose gear locking device would have to be released by me. I was able to find a section of heavy pipe in the back of the bird and proceeded into the wheel well to do battle with the nose gear. I swiped the locking device a number of times with zero results. Finally, out of desperation, I put all my clout into the next shot. The nose gear released and I almost fell through the opening. I often wonder what that green copilot would have done had this happened and I didn't return to the cockpit.

I got back on the controls as we were nearing Phoenix. The weather was grim — rain, rain, rain everywhere. I had a devil of a time contacting Litchfield Park tower. I found out later that the tower wasn't manned because they didn't have a flight plan on me. Fortunately, the local civilian airport tower heard me and put in a telephone call to Litchfield, and we finally got together. I had no idea whether my main and nose landing gear were fully extended so I had to make as soft a touchdown as possible. As we leveled into final, the crash trucks were everywhere. I kept the bird steady and landed lightly. The gear held and we all were home safe. Imagine flying a flight like that today? A green copilot, green crew and six passengers on a ferry flight? We'd have had to look for a new profession — plumbing maybe.

Let me tell you about one other hairy experience I had at Corpus. It occurred while I was checking out in the SNJ. The only prior SNJ flying I had done was at Pensacola during instrument training and that didn't involve any takeoffs and landings by me. The instructor pilot had me do some air work and then we headed for an outlying field to conduct touch-and-go landings. After about 10 of these, we made a full stop landing and the instructor pilot jumped out and told me I had the bird solo for three touch-and-gos and a full stop. Following takeoff, I raised the gear and flaps and turned downwind. I then hit the power push for lowering the gear and flaps and headed into the 180. I was on final now and ready for the first landing. At about 50 feet AGL, my right eye picked up some action adjacent to the right side of the runway. I immediately went to full power. I realized that the action was the instructor pilot who was frantically waving his arms while jumping up and down. It seems like I forgot to lower the landing gear handle. The rest of the period went okay. When I picked up the instructor pilot, he told me that, at the time I added power, the aircraft was in position for a perfect three-point landing had I had the gear down. I sure lucked out on this one. I didn't need a wheels-up landing on the books.

In December of 1946, I was released to inactive duty and headed home. I participated in the Naval Reserve for three years but a new job involving extensive travel forced me to give it up. Then in late March 1952, the Navy informed me that I was being invited back to active duty. The orders

HU-1, Unit Nine onboard USS *Saint Paul* (CA 73) in Korean waters during April '53.

Bill Holden and group during a lull in filming "The Bridges of Toko-ri."

stated that I was to report to NAS Opa Locka, Fla. on 1 May for refresher training, and then it would be on to COMNAVAIRLANT for further assignment to a VP squadron. I didn't want another VP tour. A message from BUPERS requesting volunteers for helicopter training saved me. A buddy of mine and I immediately said "I do" and we had message orders to NAS Ellyson Field the following day. We reported in early June and six weeks after wrestling with the TH-13 (then HTL-1) we were on our way to San Diego and ultimate assignment to HU-1 (now HC-1).

I can honestly say that there was no squadron I was more honored to serve with in my naval career than HU-1. The Korean exploits of these marvelous naval aviators, aviation pilots, aircrewmen and maintenance and support personnel are well chronicled, so I won't repeat them here. There were two highlights for me during my three years of duty in this squadron. One was to serve an eight-months stint on cruisers in Korea. The other was the opportunity to fly a couple of scenes in the motion picture "The Bridges of Toko-ri." I'd like to tell you a little about both.

First of all, no better helicopter has ever been built than the Sikorsky HO3S. Yeah, I know, today's helos are more sophisticated and can do a whole lot more things, but, for sheer guts and endurance, the HO3S is deserving of an aircraft medal of honor. When you learned how to fly these babies proficiently you could consider yourself a real helo pilot. Those of us who flew helos back in the early fifties took a lot of taunts from the tactical community (it's probably no different today), but when you picked up one of these guys over land in North Korea or plucked one out of the briny, their mouths exhibited teeth that resembled oversized ivory piano keys as they were being hauled into the helo. I'll say one thing for these lads though. If they knew one or more of us "angels" were frequenting the same spirits shop, the drinks came forth fast and often. I know they really admired us, crazy as they thought we and our machines were.

After a short tour on the USS *Rochester* and USS *Toledo*, my crew and I spent the next and best five months onboard USS *Saint Paul* (CA 73). We SAR'd, gun spotted, provided logistics support and did just about anything else we were capable of. I was officer in charge of HU-1, Unit 9, which, besides me, consisted of a First Class aviation pilot and six crewmen. Our HO3S side number was UP-31 and we called it the "Igor Beaver" in honor of Igor Sikorsky — the father of American helicopters.

In early July 1953, my crew and I were relieved by another unit upon arrival in Kobe, Japan, and we departed USS *Saint Paul* with many pleasant memories. However, looking forward to getting back with families and old friends was on everyone's mind.

In February 1954, Paramount Pictures was finishing the final scenes of the motion picture "The Bridges of Toko-ri" starring William Holden, Grace Kelly, Frederic March, Mickey Rooney and Earl Holliman. HU-1 was tasked to provide a helo and crew to participate in two of these scenes. One was the water pickup of Lt. Brubaker (Holden) which occurs at the beginning of the movie. The second was the attempted helo rescue of Lt. Brubaker following a crash landing of his F9F in North Korea. This occurred toward the end of the film. The water pickup scene was shot off the California coast near La Jolla, while the land scene was filmed in the Santa Monica hills behind Hollywood near Lake Sherwood. Through a bit of begging and arm twisting, I was selected to fly these scenes which turned out to be a helicopter full of fun.

The land scene went without a hitch, but following the overwater scene I nearly had a stroke. Two stuntmen were in the rear seat of the HO3S. The camera crew was positioned on an LST. I put the helo in a hover about 50 yards in front of the camera crew and one stuntman jumped into the water. After lowering the hoist and sling, the second stuntman jumped out and played the role of the rescue crewman. They

The author doubling for Mickey Rooney in front of HO3S used.

Bill Holden and friend.

had been thoroughly briefed on how the guy playing Lt. Brubaker was to enter the sling. I looked down and got a thumbs-up from the rescue stuntman. I then began to reel in the hoist. When the hoist was fully seated, I made a 180-degree left turn to simulate returning to the CV. At that point, I observed the rescued stuntman and realized that he had only his right arm in the sling. Here I was, buzzing along at about 65 knots with the guy in the sling an accident that could very well happen. I returned to the LST and set down. The other stuntman was hauled aboard a boat which was standing by for him. I talked with the rescued stuntman and he said he wasn't worried at all. Thank the Lord that fellow was as strong as an ox. If you haven't seen this movie on TV, or if you have and didn't notice, the next time it's on catch that opening scene and you'll see that the stuntman had only his right arm in the sling.

In June 1955, I departed HU-1 for New York City and duty at the Navy Recruiting Station and Office of Officer Procurement. This was the year the Aviation Officer Candidate Program came into being. My initial job was to entice college students to enter that program. It turned out to be a fine tour especially considering all the goodies readily available in the "Big Apple."

Exactly three years later, I received orders to HS-9 stationed at NAS Quonset Point, R.I. I reported aboard in July 1958. By now, the Naval Aviation Safety Program was well underway. Unfortunately, I found that this squadron had somehow not gotten the word. When I began training, I noticed everyone I flew with had a different idea on how to fly the SH-34 (then HSS-1). As a result, the mishap rate was excessive. The following year, we got a new skipper who didn't like what was going on and decided we needed a severe turnaround. Because of my helo experience, he handed me the aviation safety officer billet and told me to expedite a rehabilitation program which he would back 100 percent.

HS-9 and VS-39 operate onboard USS *Randolph* (CVS 15) during "Middie" cruise in July 1959.

The first thing we did was push professionalism. When we got everyone convinced that they could and would become professionals, we started our own standardization program. This was three years before NATOPS. Every six months each HAC and H2P, including the CO, were required to take an open and closed book exam followed by a standardization flight. We formed an aggressive aviation safety council and instituted an enlisted safety committee. This tack paid off. The squadron became professional in every way. The CO was at the forefront of the safety program and his high visibility was noted by everyone. The squadron finished the year mishap-free and won the CNO Aviation Safety Award. In addition, they received outstandings on their ORI and ADMIN/MAT inspections. Since this was my first real association with safety, it convinced me that a strong program backed solidly by the CO is the surest way to eliminate or, at least, substantially reduce mishaps.

On 1 May 1960 my last tour of sea duty in the Navy

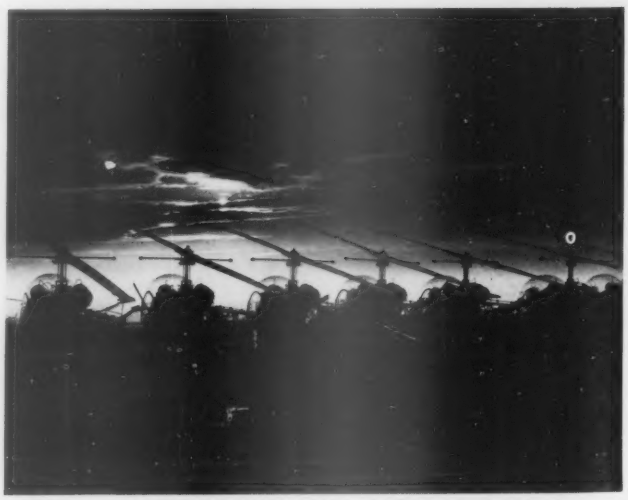
A cherished autographed photo from a fine actor and great person.

commenced when Carrier Anti-submarine Air Group Sixty (CVSG-60) was commissioned at Quonset Point. It comprised VS-39, VS-34 and HS-9. (VS-39 was split into two squadrons.) This was an outstanding air group from the very beginning. VS-39 was top drawer so when the squadron split we ended up with two great squadrons. I was ordered to the CVSG-60 staff as operations/admin officer. It was a fine tour with a professional group of aviation personnel. When you work with people like this, both officer and enlisted, it makes your job easy. In 1961, both VS-39 and VS-34 transitioned into the S-2D/E and HS-9 transitioned into the SH-3A. This would be the beginning of a whole new ball game for these squadrons, especially HS-9 with their twin-engine gas turbine helos.

I left CVSG-60 in June 1962 to report to the Navy Tactical Doctrine Activity in D.C. My job was CNO helicopter NATOPS coordinator. There were four naval aviators assigned to represent the various aviation communities. This was the beginning of what I consider to be the most important step forward in the annals of naval aviation. For the first time, those flying the aircraft would determine what operating procedures were best suited to their particular aircraft. It wouldn't be easy though. A lot of COs were badmouthing the program claiming it would usurp their authority, and AIRLANT and AIRPAC NATOPS personnel were preparing to do battle when the NATOPS conferences began. My first NATOPS conference was conducted at the Sikorsky Helicopter Plant in Stratford, Connecticut in the Fall of 1962. Talk about a war zone! The only thing the participants agreed on was to disagree. Even the most minor points of disagreement became major stumbling blocks. Since we only had one week to put the SH-3A NATOPS Flight Manual together, something had to be done to get these conferees to settle their differences. My solution was to tell the group that, if they failed to agree, the powers in Washington would make the decisions for them. It worked. By the time each of the various helo communities had met a couple of times, things settled down and the vehement differences between the assembled factions diminished. In its 21 years of existence, NATOPS has become the backbone of naval aviation.

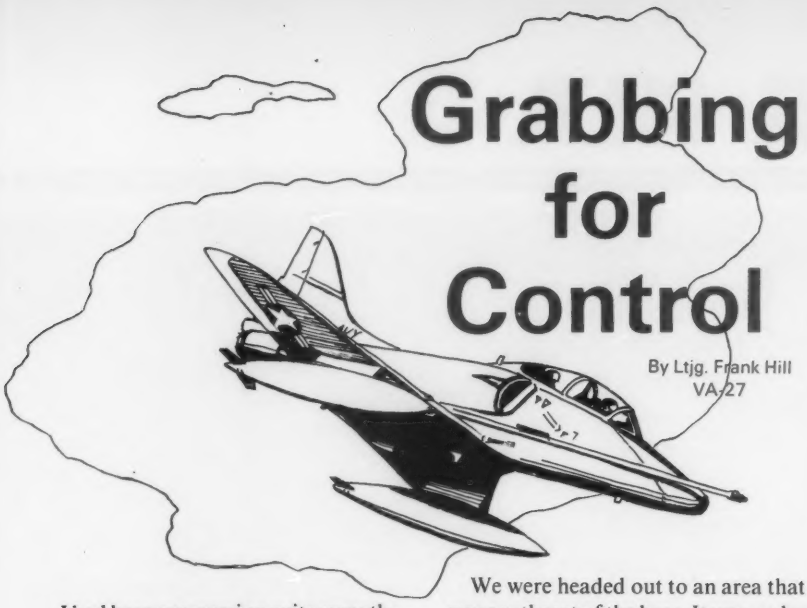
After a staff tour, I reported to NAS Oceana and retired there on 1 July 1969. I'll never forget my years of active duty. Even the bad days were better than any good days I might have had in some other profession.

In May of 1970, I landed a job writing for Approach and the other publications produced here at the Naval Safety Center. In early 1975, I accepted another civil service position, and then, in July 1980, I returned to the Safety Center and took over as the helicopter writer for Approach. It's been an extremely rewarding experience for me to work for you. I know we sometimes sound like preachers here, but if what you read results in only one less mishap, it will have all been worth it. Most of the articles that appear in Approach are submitted by you, our readers. Your firsthand accounts of situations involving hazards provide your shipmates with valuable lessons learned. Keep up the good work. In closing, I want to salute all of those personnel, both officer and enlisted, who have contributed so much to making naval aviation the highly respected profession it is. And with "My Final Approach" I bid you goodby and good luck.



TH-13s (then HTL-1s) lined up on the ramp at Ellyson Field at dawn.

Grabbing for Control



By Ltjg. Frank Hill
VA-27

I had been progressing quite smoothly through pilot training and was now in advanced jets, flying the TA-4J in Meridian, Mississippi. I was about three-quarters of the way to completing the syllabus and was up for my solo TACFORM (tactical formation) hop. The student is solo and flies wing on an instructor, performing specific maneuvers. Everything was fairly old hat by now; brief, get the weather, preflight and go. There were certain weather requirements for this hop, basically the same as required for ACM (air combat maneuvering). We needed five miles visibility, no cloud deck above 5,000 feet, a definite horizon and 15,000 feet between layers of clouds. Upon completing our weather brief, we found we had just what we needed. We manned up our trusty steeds and taxied out to the runway. It was going to be a section takeoff; there was a solid overcast at 1,000 feet. I didn't know how thick it was, but it didn't matter, I would just tuck it in, nice and tight. I always prided myself on my formation flying. We got on top at about 4,000 feet. Once we had left the clouds, I loosened it up and began to look around. To my amazement, there was no horizon. The clouds below looked just like the sky above. Everything was a dull grey-white color. It was like you were still in the clouds, only with better visibility. Unable to tell up from down, I immediately refocused on my lead.

We were headed out to an area that was southeast of the base. It was under the control of Birmingham Center; one of their outlying areas. They always seemed annoyed when we used it, and the comms were frequently poor. We were assigned a block from 10,000 feet up to FL 250 — plenty of space. The 10,000 feet was a hard deck because there were airways below with a lot of light civilian traffic.

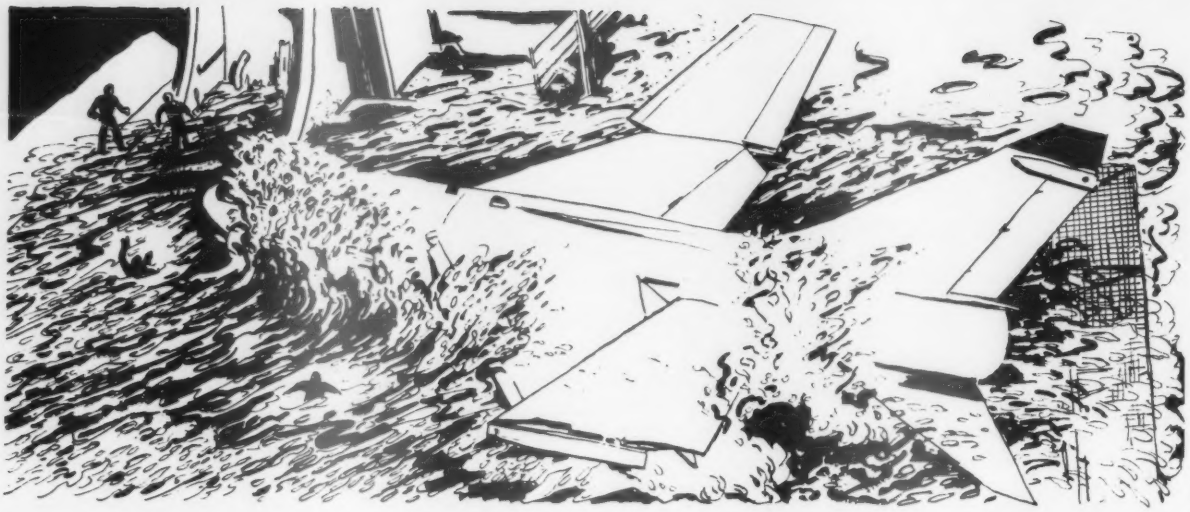
We proceeded with our combat spread turns, called and uncalled. "No problem," I thought, "Boy, am I going to rack up the grades today!" After the boring stuff, we slipped into something a little more fun, loose cruise and some mild aerobatics. I knew he was trying to spit me out, but I hung right in there. "Okay, drop back into trail and let's get some gunsight tracking," he said. Now comes the real fun! All I have to do is hang in there and call guns every once in a while, a piece of cake. The maneuvering got pretty heavy, and we were twisting and turning all over the sky. Next thing I know, the lead calls, "Fight's on." Well, I hadn't had any ACM hops yet. But I did have the ground school and some lectures, so I figured what the heck.

The instructor had gone to the vertical a couple of times, breaking off in one direction or the other, spiraling down 270 degrees to regain airspeed and then pulling nose high again. I was right behind him but not quite in a position for a shot. "This time," I thought, "I'll hesitate my roll on top, let him get just under me and reverse at the proper time, bringing my nose to bear. Easy shot, end of engagement."

The lead continued just as I expected. I also proceeded as I had planned, except . . . I was at 12,000 feet and had to hurry my reversal so I wouldn't break my 10,000-foot restriction, I wanted to be in a nose-high attitude, but looking back on the events, I must have been nose low. I timed it perfectly and initiated my reversal. I had him! That was until I went inside the cockpit to check the instruments.

The altimeter was unwinding in a blur, the airspeed was shooting through 450 knots, and the artificial horizon was black with all the heading lines coming together at a nice little point. I was headed straight down! I went to IDLE on the power, full boards and pulled to a couple of units above optimum on the AOA. My eyes were glued to the altimeter and the AOA. Nothing else mattered. I was going to recover, it was just a matter of when and how low. As I went into the clouds, there was a rushing sensation and I just squeezed the stick tighter. I never considered ejecting. I don't know if I actually said to myself, "You're not going out" or if I just didn't have the time to think about it. The whole event happened pretty fast.

Finally, the altimeter came into focus, slowed and reversed around 2,000 feet. Given the altimeter lag and the terrain altitude, I shudder to think of my true height above death. I was still in the clouds, but my nose was pointing skyward where it belonged. At about 5,000 feet, I broke free of the clouds and there seemed to be a pretty blue color in the sky now, not quite as dingy-looking as before. As I shot upward with the instructor yelling over the radio "Where are you?", I began to breathe heavily and realized what almost had happened and what could have happened if there was another plane in those clouds trying to occupy the same airspace as me. I climbed to join up with my lead. We returned home, shot instrument approaches and ended the hop. ◄



Saved By the Plane Captain. In a scenario reminiscent of the Poseidon Adventure, two monstrous waves smashed into the USS *Coral Sea's* elevator No. 1 at the hangar deck level. An A-7E was spotted on the elevator to be moved to the flight deck. When the first wave hit, it raised the elevator about six inches and swept the V-3 spotting personnel off their feet. The second wave smashed over the elevator, shattering the canopy glass, breaking the Corsair free of its tiedown chains. It shifted the aircraft 30 degrees off its original heading and started it sliding toward the edge of the elevator.

Inside the cockpit, *the plane captain locked the brakes and dropped the tailhook,* which caught the elevator coaming and stopped the aircraft. It was again chained and then raised to the flight deck where immediate emergency reclamation was begun.

This incident was triggered by an unpredictable set of huge waves whose presence was not indicative of the prevailing sea state. Only the heroic efforts of the plane captain prevented the Corsair from going to a watery grave.

In the environment of carrier aviation, this type of incident is always possible, even if not predicted. No large wave action had been experienced prior to this time.

The incident highlights the importance of routine actions during such moves. *The A-7E brake system must always be pumped up prior to any deck respot.* Had the emergency or utility brakes failed, the A-7 would have been lost. Chalk one up for a well-checked-out plane captain.

Emergency Off the Catapult. What do you do when your aircraft pitches up and rolls 45 degrees left immediately after a night cat shot? You react automatically and it better be correctly or you may not be around to recount what happened. A KA-6D crew experienced this hazard immediately after being catapulted at night and lived to tell about it.

At the end of the catapult stroke, the left outboard flap separated from the left wing. The pilot immediately applied full forward and right stick and approximately one-half of the available right rudder throw. He managed to regain a straight and level attitude and commenced to climb as his airspeed increased to 200 KIAS. Three units of left rudder trim were required to center the ball.

After a controllability check at altitude, NATOPS emergency procedures were followed and an uneventful slat down/flaps up landing was made aboard the carrier.

The separation of the outboard flap was caused by the failure of the flap hinge assembly. This resulted in asymmetric lift and an abrupt uncommanded pitchup and left roll which, if not immediately recognized and countered by the pilot's control inputs, would probably have resulted in loss of the aircraft and crew at low altitude.

The professionalism of this crew from VA-35 when confronted with an immediate low-level night emergency is best appreciated by the fact that they preserved a valuable asset and lived to fly again.

AIR BREAKS

P-3 Compound Emergency. Two hours into a flight en route to Rota, Spain, the crew of a P-3C encountered moderate icing at FL210 and started to climb out of the icing conditions. Engine anti-ice had been selected before encountering the icing. The No. 1 anti-icing light did not come on. All engine anti-icing had checked good on preflight. After climbing 500 feet, the No. 3 engine fire-warning system activated and the engine was secured. One high rated discharge bottle was discharged. A few seconds later it activated again. As the crew checked for secondary indications, the fire-warning horn ceased and the light went out. The PPC declared an emergency and began a divert to Bermuda.

Not being able to maintain altitude on three engines, a descent was initiated and fuel dumping commenced. About 150 miles from Bermuda, the No. 4 generator OFF light illuminated. Reset procedures were completed with results indicating a feeder fault. The PPC secured the No. 4 engine, planning to restart it before commencing his approach into Bermuda. The APU generator would not hold a load, and the APU continually shut itself down. The flight was continued on two engines at 4,000 feet on a single generator.

Forty miles from the field, the No. 4 engine was restarted. A successful three-engine overweight (115,000 pounds) landing was made.

Had the situation continued to deteriorate, ditching or bailout might have resulted. What was considered to be a routine all-night transit, turned out to be a test of emergency procedures and systems knowledge. Compound emergencies, for which there are no specific NATOPS guidelines, do occur. Thorough knowledge, sound judgment and crew coordination again proved to be the deciding factors in the safe completion of a "routine" flight by this VP-16 crew.

Two Inches to Spare. During flight in an EP-3A, after the radome was extended, the crew was unable to retract it. The normal extend/retract and emergency handpump retract systems were disabled when a bolt fell out and disconnected the associated drive linkages. The bolt was found, examined and determined to have been too short to allow the self-locking nut to fully engage. The alternate extend/retract drive motor could not be selected because the selector valve would not shift (the crew expended sufficient effort to break the linkage).

Except for a statement in the NATOPS Flight Manual Supplement that "The radome must be retracted during landings and ground operations," precise information on the amount of extension beyond the main landing gear could not be determined. The aircraft landed with approximately a 2-inch clearance above the runway.

A recommendation was made that any activity operating aircraft with the big look radar (APS-134) radome incorporate a Maintenance Requirement Card (MRC) to protect against selector valve problems. A second recommendation was made that Lockheed determine the optimum landing configuration in case landing with the radome extended is required.

The CO commented: "Only through good fortune and excellent piloting was this unit's mishap-free record kept intact. Despite the several aircraft which VQ-1 and VQ-2 fly with, this type of radome installed, there seems to be a lack of information as to the potential consequences of landing with the radome extended. It is hard to believe that after years of EP-3 operation, there has been no recorded instance of landing with this radome extended. If in fact we were the first to do so, let's hope we are also the last."

A Short Mission. Before a recent training flight, a P-3 crew found the No. 4 engine anti-ice light remained on after being checked. Because the turbine inlet temperature returned to its original value when the switch was turned off, the crew *assumed* the light remained on due to residual heat and high outside air temperature. They thought it would extinguish when takeoff power was applied.

After takeoff, the flight engineer noticed that the light was still on. Following an observed horsepower drop, the pilot secured the No. 4 engine by the E-handle. He then performed an uneventful three-engine landing at home field.

Subsequently, maintenance discovered a failed No. 4 engine anti-ice thermal switch. This three-engine hazard should not have occurred because the crew should never have taken off. The crew attempted to "second guess" NATOPS and substituted bad headwork for proper procedures.

In peacetime operations, missions *safely* flown are a prime consideration, but for unknown reasons, crews tend to rush and take shortcuts to accomplish the job. In this case the only pressure on the crew was self-imposed. This led them to "second guess" the system and violate NATOPS.

All aviators need to continually review NATOPS procedures, standardization notes and FARs to sharpen their aviation knowledge and skill. Such knowledge and skill must be mixed with sound judgment and awareness of the consequences for actions taken for which they are individually accountable. ◄

By R.A. (Chick) Eldridge
Approach Writer

F-14 Departure

BLAKE RADER

AIR combat maneuvering (ACM) is a necessary part of a fighter pilot's education. In fact, when the chips are down in an actual combat situation, how well he has learned to fight may be the deciding factor of whether he returns to fight another day. Unfortunately, ACM is not without its dangers, and pilots are constantly flying at the edge of an envelope — an envelope which, when its limits are exceeded, causes the pilot to face an out-of-control departure. Today, recovery from a departure in a high-speed jet aircraft is not quite as simple as it used to be when recovering from a spin in a propeller driven aircraft. Years ago, in a normal spin, it was merely determining the direction of rotation, slamming the stick forward and jumping on the opposite rudder. This technique worked for all tactical piston driven aircraft. Today, virtually all jet aircraft have recovery idiosyncrasies. It is imperative that all pilots have departure recovery techniques committed to memory. This applies to tactical NFOs as well, since they can be of immeasurable help in calling out NATOPS procedures for recovery. We are losing far too many aircraft to inadvertent departures and spins when pilots are unable to effect a recovery before reaching the NATOPS ejection altitude for out-of-control flight.

One recent mishap involved an F-14 during one versus one, similar ACM. The aircraft departed controlled flight with an accompanying starboard engine stall and entered a flat spin. When longitudinal G-forces became excessive, the aircrew ejected. The mishap pilot was on his first cruise and had been in the squadron for a year. He had completed out of control spin training while in the fleet replacement squadron. The mishap pilot and RIO had formerly been crewed with the squadron's RIO and pilot training officers respectively. When both these officers left the squadron, they recommended that the mishap pilot and RIO be paired as a crew to enhance their airborne leadership skills. This was done and appeared to be effective during the cruise.

On the flight in question, one of the options available upon completion of a combat air patrol (CAP) mission was a one-versus-one scenario. The command policy for one-versus-one, similar ACM had been briefed a few days earlier at an all aircrew meeting. The CO had reinforced the brief by stating very clearly *that the squadron would avoid any situation involving a "win at all cost" attitude.*

In the preflight brief, the flight leader stated that standard rules of engagement (ROE) would apply, but did not brief them specifically. He also did not brief stall/spin procedures. It was assumed that these items had been "briefed to death" and that everyone knew them well enough.

The mishap crew and the leader commenced their one-versus-one ACM at 22,000 feet. Gross weights of both aircraft were approximately 58,000 pounds. During the first engagement, the two aircraft made a nose-to-nose pass with a vertical separation of 1,000 feet. Two tactically unsound maneuvers by the mishap pilot allowed the leader to close quickly to a guns tracking solution less than 20 seconds after the initial pass. Because of this, the mishap pilot initiated a guns defense maneuver on his RIO's call of "break starboard." It was a right, nose low turn at 325 KIAS with full right rudder, full lateral stick and almost full aft stick. During this maneuver the F-14 started to roll left, and the pilot believed that he was about to depart. As the aircraft started to roll left, the pilot momentarily unloaded the Tomcat and reversed the controls. He applied full left and aft stick followed by full left rudder. The Tomcat then departed in a manner which the pilot had not experienced previously. At this point he wasn't certain what had happened, but he finally called "knock it off."

After applying forward stick and neutral lateral directional controls, he noted the aircraft was in a wings-level, slightly nose up attitude. He believed the aircraft was starting to yaw left and applied right rudder to counter the yaw. At this time he heard the flight leader call to neutralize controls. He neutralized the rudders and moved the stick from forward to neutral, an aft motion. Although the pilot felt the aircraft was yawing even farther to the left, he failed to verify this with either the turn needle or outside visual clues. His angle-of-attack (AOA) was at 15-17 units. Both throttles were retarded from zone 5 to idle. He then applied right rudder and left stick, but still did not check the turn needle. Upon hearing the aural overtemp warning he noted the starboard engine turbine inlet temperature (TIT)

above 1,200 degrees and that the starboard throttle had crept off the IDLE stop. As the longtitudinal G-forces continued to build, he called his RIO to eject.

When the RIO felt the aircraft depart, he noticed the airspeed read 80-100 KIAS. He felt the aircraft was transitioning to a flat spin and thought the direction of the spin was to the right. He looked for spoilers on the wings but saw none on either side. He called the pilot for forward stick, opposite rudder and to place the throttles at military. The pilot responded that the starboard engine was stalled. Very shortly he heard the pilot call "Let's get out!" The RIO initiated command ejection with the lower handle.

The Leader's Observations. "I transmitted, 'Go to idle . . . idle, idle' to assist him in case it was an afterburner blowout or quiet stall. His nose stopped its slight left motion and began a lazy, skewing/yawing turn to the right with a flat attitude. There didn't appear to be any increase in his rate of turn for the first 90 degrees. The nose pitched up to the horizon twice during the first revolution; it took about one dip each 135 degrees of turn. During subsequent revolutions the nose was steady between five degrees low and five degrees up. After the first revolution, the plane had a full flat spin developed to the right.

"I made no more UHF calls; however, I made several observations to my RIO to confirm what I was really seeing. I contemplated whether to call and advise the direction of spin or call appropriate antispin control inputs. From spin school training I decided not to interrupt whatever internal cockpit conversations might be going on. The turn took about four seconds per revolution and appeared to be very slow. At about 14,000 feet a flash caught my eye. The aircraft still looked normal and flat. We observed a second chute about two minutes later about 1,500 feet below the first. The aircraft continued in a right hand flat spin all the way to water impact . . . ."

The ejection had taken place about 50 miles from the carrier, and the crew was taken aboard a SAR helo 33 minutes after ejection.

Analysis of the Mishap. When the pilot perceived he was about to depart to the left during his guns defense maneuver, rather than neutralize controls and reduce the AOA, he elected to remain in the fight. By applying full left and aft stick, he placed the aircraft in a region of weak controllability, that in spite of subsequent proper control inputs, probably precipitated the engine stall that led to a flat spin.

The aircraft motions that the pilot believed to be an impending departure were believed to be nothing more than the beginnings of wing rock at high AOA. Nevertheless, the pilot believed the aircraft was about to depart and therefore should have ended the engagement at that time, as required by the ROE. Had he done so, the mishap probably would have been prevented.

The pilot did not comply with existing type commander/NATOPS limitations. He could not have performed the guns defense maneuver without exceeding 15 units AOA. While maneuvering at high AOA, he used excessive lateral stick in a way contrary to the recommendations and cautions in NATOPS. He violated the AOA restriction of 15 units but still had ample opportunity to avoid both the departure and flat spin.

When the mishap pilot heard lead's transmission to "neutralize controls," he interpreted that to mean neutral longitudinal as well as lateral directional controls and responded by moving the stick aft. In the RAG, great emphasis is placed on departure avoidance rather than departure recovery, and the term "neutralize controls" is widely used to direct the actions required to prevent a departure. Most phenomena occurring at high AOA can be handled by simply neutralizing controls and flying the aircraft. Many of these are perceived by pilots as departures, thus creating a mindset within the F-14 community that neutral controls are sufficient to recover from all departures.

Other aircrews, when questioned subsequent to this mishap, believed that neutralizing controls in a departure, while not precisely correct, would not hurt. Although NATOPS is clear about the requirement for forward stick in a departure, the requirement is not always reinforced by personal experience. The distinction between a high AOA roll-off and a departure from controlled flight is subtle but significant. In this instance it was felt that the call to "neutralize controls" was inappropriate and ill-timed, and the fact that the mishap pilot responded with an inappropriate action illustrates its inherent weakness.

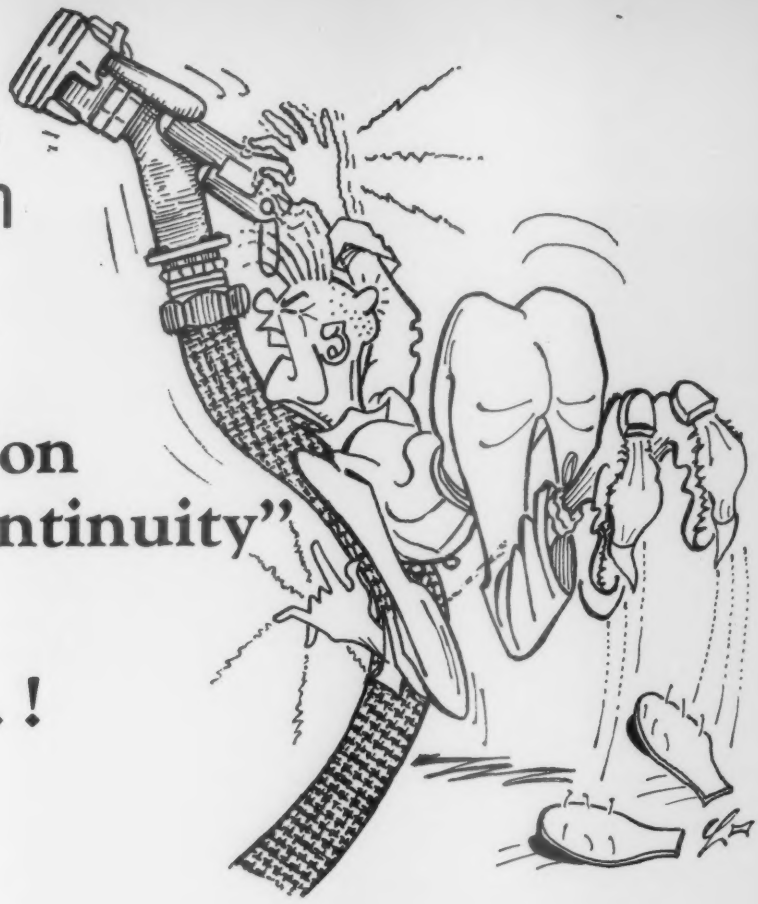
Leader's Preflight Briefing. The lack of prebriefed one-versus-one objectives may have its roots in the insidious nature of blue water operations. The "Gonzo Syndrome" can take many forms: hostility, anxiety, boredom, complacency, etc. Long periods at sea repetitively performing "routine" tasks breeds a lack of concentration. Aircrews listen but don't hear; they look but don't see. The same mission is performed dozens of times throughout a cruise. "Business as usual," is substituted for essential parts of the brief. As a result, the very thing the flight leader must ensure doesn't happen, happens. Complacency creeps into flight preparation. The reinforcement of proper procedures immediately prior to flight is essential.

In this case, the omission of the ACM ROE and stall/spin procedures from the brief was a serious deviation from SOP and just poor headwork. Had the learning objectives been briefed and adhered to, the mishap very likely could have been avoided.

Bold face procedures, trainers, spin demonstration training continue to be excellent tools to prepare aircrews to deal with the emergencies associated with flying tactical aircraft. But all of the training in the world is useless if the lessons of that training are not applied and aircraft limitations and flight restrictions designated to prevent mishaps are not respected.

The fundamental difference between combat ready naval aviators and those who aspire to that level is the quality of professional leadership exhibited in a precisely flown section or division. The qualities of precision, of smooth execution and of excellence in the air are not just picked up along the way. Instead, they are the result of hard work and a dedicated purpose to be the best, which in turn is only formed within the flight or division. If flight leaders accept slipshod performance from wingmen or are imprecise themselves during any phase of the preparation or conduct of the flight, then flight discipline is seriously degraded. Wingmen are there to learn and flight leaders are there to train. ◄

"Traveler's Observation on the Subject of Fueling Station Electrical Continuity" or Holy Sh . . . !



By Lcdr. J.K. Wehle
CV 43

There was a young fueler named Chris
Whose story is too good to miss;
He hooked a fuel hose
Below a Phantom's long nose
And found something was clearly amiss.

The flying'd been heavy, and midnight was high
When his partner came out with a sad sort of sigh.
This hose and this plane
Refuse to remain
Connected together, despite his best try.

No problem said Chris, I know just how it's done
So sit back and watch, you'll learn something, son.
Hold the nozzle like this
And give her a twist
It's not hard at all, in fact it's quite fun.

Chris held up the nozzle just like he'd said
But it wouldn't quite fit, was stubborn instead,
He pushed it and poked it and shoved it about;
He cursed and he swore and started to shout
A poor grip he declared, so his gloves he did shed.

Again with the nozzle, the plane he assailed
"I'll get it this time, I've never yet failed,"
But despite a great shove
It fell from above
And bounced off his head, the nozzle prevailed.

With cat-like reflexes, he reached out to stop
That wayward fuel nozzle before it could drop,
But a bit of a twitch
Activated the switch
Sending four-forty volts to the top.

He tried it a third time, surely the charm
And four-forty volts ran right through his arm;
He lit up like Christmas and flew through the air
Lost the soles off his boots and the curl from his hair
Quite a big thrill, but he came to no harm.

The moral my friends, though it's often been said,
No matter the hurry, you'd best use your head.
Though sometimes it frustrates and sometimes it galls
No one in this job needs any close calls.
So think of young Chris, and be glad he's not dead. ◄

C-1A Appreciation

By Capt. Jack Smith
Director of Aviation Safety Programs
Naval Safety Center

SO you want a letter from home? How about that part keeping your flyoff bird down? Or maybe you're anxiously awaiting those cookies Mom baked. Let me remind you how these goodies get aboard your home away from home: by COD!

The venerable Grumman Iron Works "Stoof" (S-2F) has been around in one version or another for 30 years. The last of the breed, the C-1A, is in the twilight of its career. When this author graduated from basic flight training in SNJs in 1956, the next bird he flew was the TS-2A, one of the C-1's older sisters. Twenty-seven years, 5,000 hours and countless traps later, a lot of my contemporaries have to visit a museum to see the second plane they flew. I am proud that mine is still serving the fleet every day. Okay, so what?

There is an attitude on carriers today that the C-1A is there to "use and abuse." True, it's a pain in the neck to the entire air department. It wants to come aboard at the most inconvenient times and be spotted on the most valuable real estate on the flight deck. This may be the reason that air bosses try to forget they even have a COD holding in the starboard delta pattern unless there are VIPs aboard. Once on deck, service is scarce and fuel is non-existent. In general, there is this feeling that the Stoof is so reliable that it can "hack" problems that should down it, such as marginal avionics, corrosion, unbalanced props or no deicing. These problems are compounded by the fact that ship's company C-1 crews often have little prop experience and don't get much flight time. And since the C-1s rarely have their own LSOs embarked, Paddles tends to have a cavalier attitude toward waving them. (See "Who Wants the COD," Approach July '83)

The recent rash of C-1 mishaps shows that this is a training/attitude problem we cannot afford. Losing a COD full of passengers is a terrible loss. If those passengers are VIPs, that loss will be added to by negative publicity that naval aviation (and you, skipper) cannot afford. COs and operations officers can fix this situation and they need to do it right away. Let the last of the great piston slappers finish up as proudly as they have served. ◄

If there are aircrewmen with doubts as to the need for rigorous water survival training, this experience and rescue should erase those doubts.

A UNIQUE

SURVIVAL

By R. A. Eldridge
Approach Writer

IT was a routine gunnery hop and events were progressing nicely for the three-plane A-4M flight until . . . on the inbound leg the leader commenced a firing run. After one-half second of firing, the leader heard and felt an explosion from the aircraft. After taking stock of the situation, he broadcast: "I've got a fire, no, I've got smoke in the cockpit; I've got a hydraulic utility light." At the same time he detected a pungent odor associated with a utility hydraulic failure which he had experienced upon three occasions previously.

His wingman, Dash 2, saw a light wisp of smoke trailing from the A-4. Dash 3, the other aircraft, transmitted, "You're smoking." Lead slowed from 350 to 250 knots and observed his exhaust gas temperature (EGT) at 340 degrees with RPM and fuel flow stable. There was no fire-warning light. As Dash 2 joined on the leader, he observed a heavy stream of light-colored smoke or fuel coming from beneath the starboard wing. Because of this he transmitted: "You're dumping." But the leader noted that his dump switch was off. As Dash 2 made a thorough visual inspection of lead's aircraft, he saw no visible signs of fire, no dark spots on the aircraft and no hydraulic fluid.

At this time the leader noted that his fuel gauge had dropped from 3,400 pounds to 900 giving him a low fuel warning light. He added power to 90 percent to commence climbing from 10,000 feet at 270 knots. He was approximately 110 miles from the base. Shortly after adding power to 90 percent, he felt a violent explosion which rolled the aircraft rapidly to the left. Lead was unable to override the roll as he moved the stick to the right, but felt no control stick response. At this point Dash 3 transmitted: "Eject, eject, eject!!" With that transmission the leader reached for the lower ejection handle and ejected. He was at 270 knots inverted at ejection.

Following his ejection, the leader described his sensations in the following manner: "My experience from a previous ejection led me to believe that this was a rather violent ejection. I could feel the windblast which pinned my left arm against my chest and my right arm flailed out. After several revolutions, my chute opened. The chute was oscillating, spilling air with each swing. It was at this time I noticed that I had no use of my right arm. (The ejection dislocated his arm and broke the upper arm bone (humerus).) From my training I remembered the IRSOK aid — inflate LPA, raft, stabilize the chute, oxygen mask and Koch fittings. I inflated my LPA. When I looked for the raft release handle, I noticed the rigid seat survival kit (RSSK) hanging below my ankles. There was no way I could reach the kit. I looked for the four-line release toggles and saw the left one above my head. I could not see the right one. I removed my oxygen mask and it fell away since it had separated from the RSSK. I used my left hand to place my right hand on the right Koch fitting. Upon water impact I popped both Koch fittings and the chute blew away. Since my raft was not deployed, I wanted to be certain to get out of my chute as soon as possible. With the use of only one arm, I was not certain if my LPA would prevent me from sinking if I got entangled in the chute. I took my helmet off and decided to drop it when I got close to the water. What I estimated to be 30 feet, turned out to be 300 to 400 feet judging by the size of my helmet when it went in.

"During my 12-minute parachute ride I also noticed that my radio and survival knife were lost, probably from the ejection. Once in the water, I rested about a minute and then began to work on getting my life raft out of the RSSK. I removed the raft, found the inflation bottle and inflated the raft."

Because the leader had use of only one arm, he had a great deal of difficulty attempting to get in the raft. After struggling for 15 minutes, he managed to place both feet in the raft and then pulled it beneath himself. Once aboard the raft he inventoried the raft's contents. He found that the RSSK was hanging under the raft. He had difficulty recovering the kit. However, using the left-hand pull, teeth grasp-method he recovered the RSSK kit survival equipment. After getting the RSSK aboard, he removed the URT-33 radio, raised the telescoping antennae and then found that the switch was broken. He found a can of water and can opener and drank the water.

His sea dye marker was floating on the sea. He tried to stay busy by rechecking the URT-33. He estimated that it would be an hour and a half before any search aircraft would arrive in the area. Two minutes before his estimate was up he heard a helo. When he thought that the helo had him in sight, he popped a smoke light by placing the ring in his mouth and pulling. When he felt certain that the helo had the wind direction, he extinguished the smoke in the water. He also took the battery out of the URT-33, thus eliminating the possibility of having Guard Channel clobbered for the next several hours. When the helo arrived overhead, a swimmer was lowered into the water. After being hooked to the D-ring, the leader was hoisted into the helo very much in pain from his immobile right arm.

The mishap pilot expressed the following thoughts about his survival ordeal: "I had just had a refresher on survival at NAS Jacksonville six months earlier. The people there were really professional and their training really proved to be valuable. However, they didn't prepare me too much for a survival situation with only one hand. *I realized soon after my ejection that the only thing which could kill me was if I defeated myself mentally.* I knew I could float for a couple of minutes without my LPA; once it was inflated I knew I'd make it.

"You've no doubt heard it said that you fight the way you train. The same is true for survival. No training — no survival." ◄

Anything But Routine

By Lcdr. R.W. Jacobs
VA-196

NAVAL aviation is sometimes sardonically referred to as hours of routine or boredom interrupted by moments of terror. For one A-6 crew, that moment of terror, or in this case panic, came during what shortly before had been a routine flight deck taxi while clearing the landing area after an arrestment. The routine-"ness" was magnified because the cruise was nearly over and they had done this very same thing nearly a hundred times in the recent past. This incident also involves interlocks, both mechanical and electrical, that are designed to keep the control surfaces on the wing from being damaged by wingfold motion. As this crew learned, routine overriding of safety interlocks can turn even the most routine evolution into one that will never be forgotten.

The A-6 requires that flaps and slats be full up before the wings are folded. As previously mentioned, there are interlocks to keep the flaps, slats and wingfold coordinated; however, many of these can be controlled or overridden by the crew. Such was the case when, as the flaps and slats were transitioning to the up position after the trap, the BN raised the wingfold handle to the unlock/spread position and selected unlock on the electrical lockpin switch, causing the hydraulic winglocking pins to be retracted and arming the fold position of the handle. This was his normal habit pattern which he felt expedited the wingfold once the wing was clean. In actuality, only a second or two is "saved" by this preliminary action. This particular time, events took a novel twist. The flaps never indicated clean. (It was later determined to be an indicator problem.) As the aircraft taxied clear of the foul line, the BN signaled "flaps" to an assembly of troubleshooters who had noticed that the wings were not folding as usual. An airframes troubleshooter verified that the wing was clean and then climbed up to the cockpit on the port (pilot) side as the canopy came open. At the same time, another troubleshooter, one who had not seen the BN's flap signal and who knew that the aircraft had a history of wingfold problems, verified that the wing was clean, saw the wingfold flags up and logically assumed that the wingfold system had failed. Being an aggressive stroker, he immediately tackled the problem. Before the BN could think to counter him, the troubleshooter had jumped onto the starboard wing and pulled up on the flag. The BN watched helplessly, in utter horror, as the starboard wing started to fold. In the meantime, the troubleshooter on the pilot's boarding ladder, suspecting that he had a flap indicator problem, started to run the flaps and slats down using the emergency system, which overrides the electrical wingfold interlocks. Intently watching the port slat run full down, neither he nor the pilot noticed the starboard wing folding. The BN reported the fact to the pilot but it was too late. Only when the BN looked to recheck the flap position indicator did he see the troubleshooter running the flaps and slats. More panic! Now that the pilot and BN fully realized what was happening, they desperately wanted to stop the chain of events. There was no clear course of action however, because while the starboard wing was folding, the wingfold handle was still in the spread position. Moving it to the fold position with the flaps and slats full down would surely damage the port wing. Understandably, no action was taken. But for this crew, it just wasn't their day. When the starboard wing reached the folded position, the selector valve linkage realigned itself and the wing spread without warning. Up to this point, unbeknown to the crew, no significant damage had been done. However, because the wing had originally folded while the flaps and slats were in transit, the outboard slat drive disconnected in mid-travel causing the outboard slat position to be misaligned with the inboard. The serious metal-bending occurred when the wing spread fully. The already drained BN couldn't believe his eyes as he glimpsed motion in his periphery and turned to witness the final destructive act in this drama.

The only chance this crew had to save themselves and stop the out of control chain of events was a fleeting moment early in the sequence during which they could have restored the locking pins. Once that moment was past, they were along for the ride. Fortunately, they could walk away from this incident, albeit with only somewhat damaged egos. How about you? Shortcutting safety interlocks or procedures may have worked for you during countless routine evolutions in the past. Nevertheless, routine can turn to "out of control" or "unstoppable" when you least expect it. Why take the chance? Leave your "stops" in place and they will be there when you momentarily lose control of the routine.

Recipe for a Safe VERTREP

By Lt. J.M. Huffman
CV 43

Ingredients

One — large carrier in need of replenishment (deployed)
Four or Five — escorts (various destroyers, frigates, etc.)
One — AFS
Two — tandem rotor helicopters (medium)
Four — hungry, sleepy helo pilots
One — air boss (not necessarily in good humor)
One — working party (awaiting arrival of supplies)
150 Tons — supplies (food, Coke, dry goods, parts, etc.)
One Ton — battle group mail
One Dozen — supply officers
Four — forklifts (working)
One — LSE (landing signal enlisted)
One — deck spotter and hook-up man.

In a large ocean with a cover of darkness, combine the carrier with the escorts diced to provide the battle group with cover. Fold in AFS, supply officers and air boss. Simmer ingredients for approximately 30 minutes or until the plan gets straightened out. In the same ocean, mix up the helos and pilots ready for the VERTREP to begin. On a separate flight deck, mix LSE, deck spotter, working party and forklifts. Combine carrier battle group mixture while gently dropping in supplies and mail. Beat ingredients well for three to four hours. To make it safe, you only need to add a 110 percent effort of all involved.

Yield: One carrier battle group sufficiently and safely resupplied for another on-line period.

Approaching the approach

By Lcdr. G.R. Murchison
VA-27

HAVE you ever been surprised on an IFR approach by a radial or altitude that was there before you expected it, or by a missed approach point that got there long before you reached MDA, or by an approach that dropped you off at a point in the sky from which there just simply wasn't any way to safely land the airplane? These things fall into that broad "those who have and those who will" category. As long as you have a sound airframe and enough gas to try again, it's no big deal . . . just an embarrassment. But when the pucker factor is high, you don't need any additional surprises, so a way to avoid unnecessary ones is worth a look.

While this article is concerned with flying the non-precision approach with precision, the basic principles can be applied to all phases of flight and to all types of machines that venture into the sky.

The idea is to eliminate surprises inherent in the geometry of an approach when an airplane or pilot would much rather follow a different path of flight. The differences in the tendencies of the airplane/pilot and the published approach may lie in the specific performance characteristics of the aircraft, standard operating procedures, the way we train, pilot preferences or any combination of these factors. In order to force the aircraft to comply with the approach, we may have to modify the way we "normally" do things. The object then is to have a quick way to plan how to make the airplane conform with the parameters of the approach that's easy, safe and eliminates surprises.

First, it is useful to translate the way our airplane performs into some rules of thumb that work and can be quickly and easily applied to the problem. For this article, I'll use A-7 parameters. The parameters for your airplane will modify your approach to the solution, but the principles are the same. Also, before you rely only on the charts in your NATOPS or Dash One manual to come up with performance numbers, remember that the idea is to come up with

Editor's note: For our nonaircrew readers, a glossary for this article appears on page 22.

numbers that are easy to use. You will need to practice in the air to find out how the airplane performs for you when flown the way you want it to fly. For example, the "book" idle descent for the A-7 is computed at max range airspeed, which varies with gross weight, and the rate of descent at a given gross weight and airspeed varies with drag count. So to keep the airplane close to the rule of thumb that I want to use during a constant 250 KIAS "idle" descent, I'll have to carry a bit more than idle power with my normal configuration of racks and stores. Since the geometry of the approach is set up over the ground and not in the moving air mass, I also will have to crank a fudge factor in for existing winds, as well as for variations in true airspeed due to altitude and prevailing atmospheric conditions. But even with all these factors that dictate what the airplane is really going to do, it is still possible to find easy to use rules of thumb that work; ones that will give you a very good baseline of performance from which only minor deviations will be necessary to make the airplane perform exactly the way you planned it.

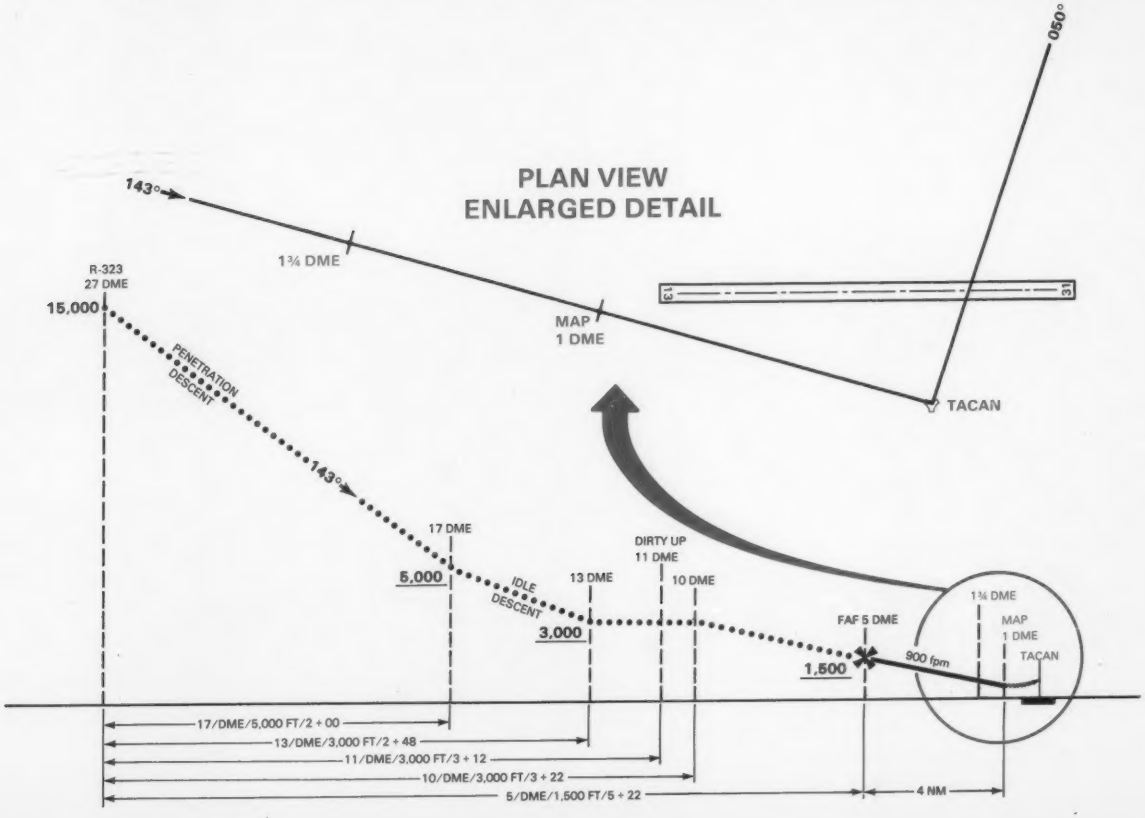
To make the rules easier to use, aircraft performance needs to be defined in the same terms that define the approach. So on a TACAN approach where altitude requirements are specified in terms of distance, (DME or radials crossed) it's more useful to define a descent in terms of feet per mile than feet per minute.

Here are some rules of thumb that work in the A-7:

1. Penetration descent (250 KIAS/4,000 FPM rate of descent)
   a. NM/minute — 5
   b. Altitude loss — 5,000 FPM, 1,000 feet per mile
2. Idle descent (250 KIAS/Idle power)
   a. Rate of descent — 2,500 FPM, 500 feet per mile
   b. NM/minute — 5
3. Distance required to dirty up (250 KIAS to stabilized, trimmed, landing configuration at optimum approach speed) 3 nm (or one min) + 2 nm (or one min) per 1,000 feet of altitude loss required during the transition.
4. Approach speed — 2½ nm/minute
5. Turn radius
   a. 250 KIAS/30 degrees AOB — 3 nm above 5,000 feet MSL, 2½ nm below 5,000 feet MSL.
   b. Approach speed, SRT — 1 nm

Now let's look at planning an approach using the rules of thumb — the HI-TACAN initial approach fix 13R at Corpus Christi NAS, a simple straight-in. For planning, the approach is divided into three parts: 1) from initial approach fix (IAF) to final approach fix (FAF), 2) from FAF to landing or missed approach and 3) missed approach.

1) To be at the FAF of 5 DME and 1,500 feet, on speed, in the landing configuration, the transition should begin at 5



nm (FAF) + 3 nm + 2 nm per 1,000 feet of altitude to be lost during the dirty up. Since there is a 3,000-foot restriction at 10 DME, 1,500 feet must be lost, and using the rules of thumb, the transition should begin at 5 + 3 + (2 x 1.5) or 11 DME at 3,000 feet, 250 knots. Right away the use of thumb rules has eliminated a potential surprise by revealing the need to start the transition to the landing configuration outside of 10 DME due to the altitude that needs to be lost in the five miles just prior to the FAF.

To abide by the "minute to live" rule (keep the rate of descent equal to or less than the altitude AGL) the normal penetration descent should be shallowed at 5,000 feet AGL (platform). Since this approach is over water, platform will be 5,000 feet. But where over the ground does platform need to be so that the already computed dirty up can begin at 11 DME, 3,000 feet? If a 2,500 FPM rate of descent is used from platform, then 4 nm is needed (500 feet per mile) to lose the 2,000 feet from 5,000 feet to 3,000 feet; therefore platform needs to be at 15 nm or more. With a penetration descent (1,000 feet per mile) begun at 15,000 feet and 27 DME, (IAF) then platform will be reached at 17 DME, leaving two miles to play with, or enabling a commencement from 17,000 feet without having to worry about hurrying the approach.

2) From the final approach fix, what rate of descent is desired? First, go to the airport diagram to see where the missed approach point (MAP) is relative to the runway. In this case it's nearly abeam the threshold! If breakout in an A-7 were at this MAP, the aircraft would be committed to a missed approach. So where do we really want to be at MDA? To get a three and one-half degree glide slope at 307 feet three-quarters of a mile from the end of the runway HAT is a nice place to be, so shoot for being at MDA at one and three-quarter miles DME. That leaves three and one-quarter miles for the aircraft to lose 1,180 feet. With an approach speed of two and one-half nm per minute, we have about one and one-third minutes to lose about 1,200 feet, so the minimum rate of descent required for this approach will be just about 900 fpm. With this rate of descent you can expect to be at MDA just inside of two DME with the runway out at 11 o'clock, three-quarters of a mile. If the runway's not in sight, you can continue to drive on in to the MAP at MDA, but realize that once inside of about one and one-half miles DME you probably won't be able to make a safe landing anyway.

3) Missed approach — This one looks pretty simple: turn left to 050 degree radial and climb to 1,500 feet. But there is one question to be answered — flaps down turn or clean up and then turn? Since it's a 90 degree turn at one mile DME, it'll have to be flaps down. This is nice to know before you're there.

At first glance, approaching the approach in this manner may seem like a terribly long, drawn out process. But with a little practice it'll only take about 10 minutes to fully plan a new approach and less than five to review a familiar one. Try it, you'll like it! ◄

Glossary

AGL — above ground level; altitude measurement above the local terrain
AOB — angle of bank
Dash One — the rules the Air Force flies by
DME — distance measuring equipment; the distance readout in nautical miles on a TACAN receiver
FAF — final approach fix; the point where the final portion of an approach begins: defined by MSL altitude, direction and distance from a TACAN station
FPM — feet per minute
HAT — the height of the MDA above the approach end of the runway
IAF — initial approach fix; the point where an approach commences: defined by MSL altitude, direction and distance from a TACAN station
IFR — instrument flight rules, as opposed to visual flight rules
KIAS — knots indicated airspeed
MAP — missed approach point; the point where a pilot must discontinue the approach if he cannot see the runway
MDA — minimum descent altitude; on an instrument approach that altitude below which a pilot may not descend without having the runway environment in sight
MSL — mean sea level; altitude measurement above sea level
NATOPS — naval aviation training and operations standardization; the rules naval aviators fly by
NM — nautical miles
SRT — standard rate turn; three degrees per second of heading change
TACAN — tactical air navigation; an electronic navigation aid that provides a pilot with both direction and distance from the TACAN station

Check List For FOD

By Lt. J.D. Niermeier
VA-196

Just have a FOD? Got a few bare firewalls? The following suggestions should help you get started on the road back and give you some ideas to help prevent future FODs.

Parts Accountability. Keep track of all new fasteners, screws and bolts being installed, and all removed parts to prevent extra or used fasteners from ending up in an intake. Account for old safety wire and new clipped ends from each job.

FOD Walkdowns. Ensure all areas (i.e., line, hangar, flight deck and taxiways) are thoroughly covered and monitor the walkdown to keep it organized. Collect the FOD from each walkdown and analyze it. Not only will this indicate progress, it will also point out problem areas. Remember, walkdown is a last ditch effort to stop a FOD due to improper maintenance and housekeeping. Return the FOD to its source to help each department discover any weaknesses.

SE Tool and Spare Parts Control. It's just as important to check the yellow gear and troubleshooter's truck for sources of FOD as it is to preflight aircraft before launch. Get rid of all the "junk" stored in the truck and remove all the loose support equipment (SE) parts.

Line Area. Review taxi and traffic routes to avoid the additional FOD hazard from unnecessary traffic on the flight deck or line. Use minimum power in the line and maximum interval between aircraft while taxiing. Look into the use of sweepers and padeye cleaners to prevent a FOD from sand, non-skid or other small FOD.

Aircrew Preflights. Man up early to allow time for a FOD walkdown in the immediate area and a thorough check of the aircraft for missing fasteners. Also have all aircraft checked for missing screws, fasteners and rivets, etc., before moving them to the flight deck or out of the hangar. Document all missing parts.

Duct Divers. Have only a few certified divers to check engines before and after every launch. Avoid using too many people for checking the intakes to avoid potential FOD hazards.

Meetings. Meet with other squadrons to discuss the total effort and exchange ideas.

Education. Everyone knows what FOD is, but most people have trouble connecting the screw they just dropped with the resulting engine damage. Make them aware that every piece of FOD on the deck can very easily make the journey to a three-foot high intake. Education to increase the awareness and continual vigilance against the "dumb" FOD will really pay off. The dropped gear pin, the lost/missing tool and the flashlight in the intake are continual sources of FOD that are very easily stopped.

CDI. Make them aware of their responsibility to check the job and area for FOD. Reinforce and expand the "18-inch rule" to include checks for FOD, not only at the job but around it also.

The Final Requirement For a Successful Program is Involvement. No matter how well the FOD is picked up and parts accounted for, unless everyone (from the CO down to the most junior airman) is totally involved and aware of FOD, it is still easy to have a FOD incident. Each man must realize that it is just as important to find that dropped screw as it is to finish the job. They need to care about FOD. Publishing the results of the walkdowns, taking pictures of all the FOD and listing which shop it came from will help them realize how quickly it adds up and who is responsible. Some type of monitoring program to "catch people in the act" will help enlighten your men and make them think before they throw down that broken fastener or put that flashlight in the intake. ◄

Keep the program positive. Keep everybody's mind on preventing FOD and that last FOD you had *will* be your last.

Paddles Contact

The effect of wind on carrier landing performance

By Lcdr. R.C. Yakeley
OIC U.S. Navy LSO School

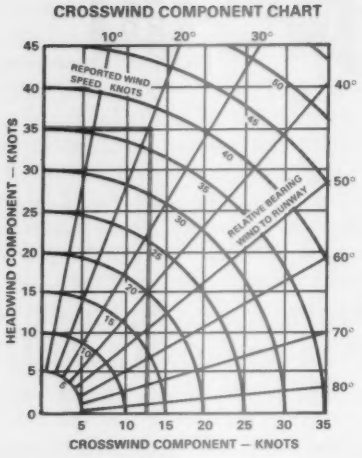


Figure 1

YOU call the ball in your lean, mean fighting machine during a night "attempt" at the deck of a modern nuclear aircraft carrier. The LSO responds with "Roger ball, 35 knots, axial." What information does this transmission provide other than to distract your scan of the plane guard destroyer passing beneath you? First of all, "Roger ball" informs you that the LSO has you in contact and you are now under his control. Incidentally, the term "Roger ball" stems from the days when the LSO used paddles to position the aircraft. When the paddles were held horizontally, this indicated your approach was OK or you were in the "Roger" position. So, although the "Roger ball" is the center cell of the Fresnel Lens System, the "Roger ball" call is given even though you may not be within the centered cell.

How about "35 knots, axial," what can you derive from this? Axial winds normally occur when there is little or no natural wind and the ship must generate its own wind. This wind naturally flows down the ship's axis (hull centerline). Thus, axial wind is starboard of the landing centerline from 9.3 degrees for Nimitz-class carriers to as much as 13 degrees for the Midway. As the crosswind component of recovery wind increases, the burble moves closer to the ship with airflow disturbances increasing sink rates as much as three to six feet per second. Corrective pilot technique *will* be required if the crosswind component exceeds 10 knots on most aircraft carriers. Figure (1) illustrates that with 35 knots of wind, if the winds are five degrees starboard of the axial (approximately 15 degrees starboard on the angle) then this 10-knot crosswind component is easily reached.

What about the *burble*? What is it really? The burble is a change in airflow caused by the ship moving through the air mass. An area of low pressure is formed aft of the ship causing the airstream along the flight deck to be directed downward until the surface of the water is reached. This airflow is then deflected upward in the form of a "rooster tail." Additionally, airflow disturbances occur close to the ramp caused by irregular upwash and downwash from the ship's hull. Wind turbulence on the deck from parked aircraft, yellow gear and the island also impact your flight path (the burble effect is greater when the ship is making its own wind).

What then, is the net effect of 35 knots of axial wind? Anticipate a greater than normal concentration of lineup with glide slope tending to be slightly high in the middle to inclose. Be prepared to recorrect for your power reduction while attempting to counter this rise from the "rooster tail" as there will be a settling tendency due to the low pressure area aft of the ship. Anticipate the rise followed by the settle by *leading* the power correction.

Optimum wind over deck. Extensive flight tests aboard several aircraft carriers have demonstrated that optimum winds are 25 knots for jet aircraft and 15 knots for prop/turboprop aircraft. These winds minimize the burble effects (increased sink rates and random wing drop). As relative headwind increases, the power setting for steady state glide slope control also increases. This higher power setting allows for more rapid engine response. However, this improved engine response is offset somewhat by a more pronounced settle with an equivalent power reduction. Higher winds also have a greater effect on gust responsive aircraft such as the F-14, E-2 and S-3.

The bottom line is — listen to the wind calls and be aware of the headwind and crosswind component effects on your aircraft. This awareness will help you anticipate the corrections required to attain the OK-3.

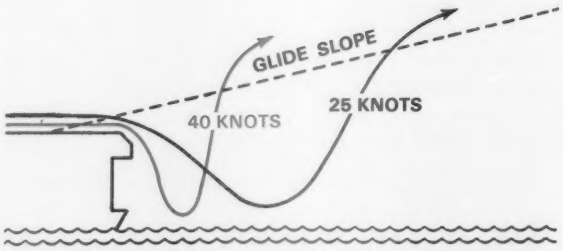


Figure 2

The Marble Theory

By Lcdr. P.S. Mansfield
VA-75

AS we depart on cruise after an extremely intense workup period, I wonder how we're going to maintain the high motivation found during ORE*. Yes, I know, what else does the safety officer have to do? OK, that's part of the job. I'm just trying to put into perspective the enormity of a seven-month deployment.

My CO put it best: "Accept it, we're out here and our goal is to bring *everybody* back with us!" I liked that — just the sort of thing the safety officer likes to hear. Now, how do we do it? I mean, seven months is a *long* time. How do I keep interest and motivation up? The answer, I think, — I can't. Not by myself anyway. Everyone's got to do his part, from the most junior airman to the skipper. We work as a team, you know. The maintenance guys have to do their job right to keep themselves and the airplanes healthy; the administration and personnel guys have to keep the paperwork going, and the flight crews, upholding their end of the bargain, have to fly the airplanes safely. Sounds simple enough, doesn't it? Everybody just does his job. Easy, no problem here! We've proven time and time again during workups that we can hack it. Routine, that's the word, it's just routine. Or is it?

During my first deployment, I was involved in a "routine" night raid that terminated in tragedy. The mission called for two A-6s to simulate enemy bombers, along with four A-7s which would simulate their cruise missiles. Fighter aircraft would then attempt to intercept these "raiders" in defense of the carrier. It was a bright moonlit night, halfway through a Med deployment. Each raid element was inbound on their respective radial to the point where we launched our A-7s. As I called missiles away, I watched the A-7 on my port wing detach then begin his descending, accelerating profile. Confident that he had cleared my airplane, I went back on the gauges to ensure I didn't leave my assigned altitude of 20,000 feet. Shortly thereafter, we experienced an unin-duced, violent wing rock and pitching moment (similar to flying through jet wash) followed immediately by a bright flash. I thought, "My engines have exploded" but a quick glance at the instruments assured me that this was not the case; however, my BN started calling over the UHF, "Mayday, mayday, mayday." Quickly, I wanted to reassure him that even though *something* had happened, we were not in dire straits. Before I had a chance, he continued, "This is 504, we've just had a midair with 302." "We did!!??" I calmly asked. Now, looking outside, I saw the lights of another aircraft rapidly descending below us.

Just that fast, it wasn't routine anymore. The A-7 on the starboard wing had turned back into us and impacted from below. A SAR effort was immediately initiated for the A-7 pilot, but he was never found. Assessing the damage to our own aircraft as we turned toward the ship, a flashing master caution light directed my attention to a rudder throw light. In itself, this was no big deal, but it made me suspect damage to the tail. The airplane was flying fine, though. Next, I noticed the starboard outboard droptank fuel quantity had gone to zero. Telling my BN, he looked out-and discovered our droptank and bomb rack on his side were missing. Wow! I wondered what else could be wrong with the wing, damaged flaps/slats? About this time, the other A-6 had joined. His call of "being able to see stars through your airplane" was not encouraging. With our playmate watching, we began a slow flight check at altitude and discovered that everything was in proper working order except the hook, which was jammed in the fuselage. With a suitable divert nearby, we completed our "routine" flight with a night landing at a foreign field.

Routine flights like this one have made me a firm believer in the "marble theory" of flight. You see, there's this big jar full of white, gray and black marbles. There are a lot of white ones, a fair number of gray ones and just a couple of black ones. Each time you go flying, it's like reaching into that jar of marbles and pulling one out. White means a safe flight, no problem. Gray means a close call. These are scary, but quick reactions and a little luck will pull you through unscathed. And then there is the black marble — waiting to bite you if you let it. To survive the black marble flights, you're going to need it all — aircraft knowledge, judgment, alertness, you name it. Oh, I almost forgot: You don't find out the color of your marble until you get back. The only way to beat the marble theory is to assume every one is going to be black.

*Operational Readiness Exercise

An exceptional bit of airmanship saves an A-7 to fly another day.

THE flight had been a routine day-air intercept exercise until Ltjg. Allen McGinnis tried to lower the landing gear in his A-7E in preparation for landing aboard the carrier. As he lowered the gear handle, he discovered he had a problem — a big problem! His port main landing gear would not come down.

After informing the carrier of his problem, he was advised that the airwing LSO, Lcdr. "Hoot" Gibson, was airborne in another Corsair and would join him for a visual inspection. The visual inspection confirmed that the gear door was partially open, but the port main mount was still hung up.

The pilot followed the NATOPS procedures for a hung main landing gear, including various combinations of yaw, high and low-G and high-speed pullouts without success. For such an emergency in an A-7, NATOPS recommends barricade engagement if a suitable divert field is not available.

Diego Garcia was available as a divert field and the decision was made to arrest this emergency there. It was extremely fortunate that E-28 arresting gear had been installed at Diego Garcia two weeks earlier. The LSO was also diverted so that he could wave the crippled Corsair into the short field gear.

En route to Diego Garcia, the pilot experienced radio failure. Undaunted by this additional problem, he used his PRC-90 survival radio to communicate with the LSO and the carrier. He advised that unless incoming transmissions were concise and spoken deliberately, the reception was garbled.

Once on station on the runway, the LSO informed McGinnis that he would be flying his approach with a 12-knot tailwind making for an even more difficult landing. Several practice approaches were made to burn

Ltjg. Allen McGinnis
VA-37
A-7E

BRAVO ZULU

down to 800 pounds of fuel before beginning the arrestment attempt so as to minimize the likelihood of fire. It became apparent that a successful arrested landing would be extremely difficult because of the requirement to touch down close to the arresting gear to preclude the left wing from falling through. In retrospect, this decision did not take into account the difficulty of executing a field arrestment under the conditions of a light aircraft, hung gear, tailwind, no HUD (Heads-Up Display) and flying into the gear.

On the first arrestment attempt, a bolter resulted. The port wing dropped slightly on touchdown, but the pilot was able to hold it up with aileron and successfully take off. On the next pass, the LSO called "Idle, idle, idle," but because of poor PRC-90 reception the pilot thought the calls were "Power, power, power." When he added power, he did not touch down. On his third approach, the hook engaged the E-28 gear successfully. The pilot held the left wing up as long as possible before the A-7 made a slow turn to the left, coming to rest at the edge of the runway on the nose gear, starboard main gear and left wingtip. Fuel remaining was approximately 200 pounds. Repairs were made and the aircraft was flown back to the carrier the following day.

The temporary E-28 arresting gear at Diego Garcia, installed for a special Air Force/Navy exercise, paid for itself with this save. With arresting gear, Diego Garcia is a tremendous Indian Ocean divert alternative.

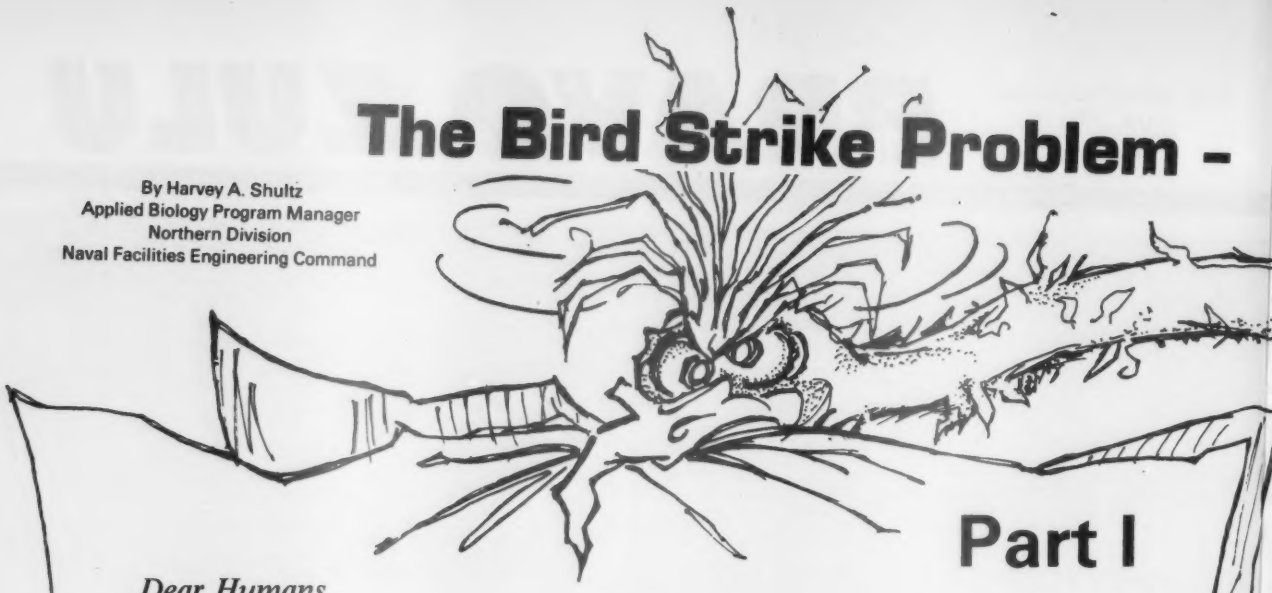
As a first tour aviator, McGinnis did an outstanding job of executing a flawless field arrested landing in an *extremis* situation. Because of his superb airmanship, a potential aircraft strike was averted and a valuable Corsair II remained in service.

In addition to the main participants of this emergency, the officers and men of Diego Garcia are commended for their outstanding services.

Ltjg. Allen McGinnis (left)
Lcdr. "Hoot" Gibson (center)
Radm. Thomas F. Brown III (right)

The Bird Strike Problem -

By Harvey A. Shultz
Applied Biology Program Manager
Northern Division
Naval Facilities Engineering Command



Part I

Dear Humans,

To date, articles about bird strikes appearing in Approach and Weekly Summary have mostly been written from the pilots' point of view. The emphasis has been put on pilots killed or injured, aircraft damaged and missions aborted . . . but nobody seems to care about us birds! You think it's easy being a seagull around a Navy or Marine airfield? How would you like to play chicken (sorry) with an A-6 doing 250 knots or a P-3 homed in on you with all four "food processors" screaming? And you guys think you are funny with comments like "PIC did not have a current federal duck stamp, although the birds were in season." Well, let me tell you something . . . that "thunk" that you reported last night may not have spoiled your evening, but you should have seen what it did to my friend Jonathon!

You aviators are obviously more concerned with making 0-6 than you are in preserving our nation's seagull reserves. One of you picks off one of my relatives every 22 hours. So I had no choice but to appeal to the biologists to get my message across. I turned to the Applied Biology Staff at Northern Division, Naval Facilities Engineering Command. Applied Biology Program Manager, Harvey Shultz has tasked Thomas Walker to coordinate NORTHDIV's bird-aircraft strike reduction program. Harv's management analysts, Thomas Snoich and Cliff Kellett have analyzed hundreds of strikes which occurred in recent years. Hopefully, they can provide you aviators some clues as to how you might reduce the rate at which you are running into us birds.

Respectfully,
Daphne F. Duque
Bird Colonel

A Bird's Eye View

Eleven hundred and ninety-three collisions between naval aircraft and birds occurring from 1 Jan '81 and 31 Dec '83 were logged from mishap and hazard reports. The data recorded consisted of date and time of the strike, aircraft and squadron or command involved, use of landing lights or strobe lights, phase of flight, path relation, proximity to clouds, location, route of flight, damage to aircraft, impact point, number and species of birds, latitude and longitude, etc. All parameters were sorted and analyzed in order to identify trends that could be used to prevent future strikes. Many of the results were predictable, but there were also a few surprises:

Where Bird Strikes Occurred

NAS Moffet Field — 47
NAS Brunswick — 43
NALF Cabaniss Field — 38
NAS Point Mugu — 32
NAS Jacksonville — 29
NAS Corpus Christi — 29
NAS Kingsville — 27
NAS Whidbey Island — 25
MCAS New River — 24
NAS Cubi Point — 22
NAS Patuxent River — 22
NAS Rota — 21
NAF Mayport — 21
NAS Chase Field — 20
NAS Cecil Field — 16
NAS Norfolk — 16
NAS Barbers Point — 15
NAS Oceana — 14
MCAS Cherry Point — 14
NAS Alameda — 12
NAS North Island — 12
Clark Field, Phillipines — 11
MCAS Beaufort — 11
OLF Imperial Beach — 11
Dare County Target — 10

Another 143 sites reported at least one bird strike. The figures are not an indictment of any of these locations as having inadequate bird strike programs. To the contrary, it may well mean that certain locations have a combination of bird and aircraft activity that predisposes it to strikes. That is, birds and aircraft operate in the same airspace at the same time. But this very concept can be used as a cornerstone of a bird-aircraft strike reduction plan.

There are variables we have no control over because of mission requirements. Much of our flying must continue to be done at low altitudes and/or high speeds even though we know these conditions are conducive to strikes. On the other hand, rescheduling of routine operations around times of peak bird activity may be possible without affecting accomplishment of some missions.

Just which "brand" of birds are we hitting these days? Some identifications consist of split-second, high-speed

observations made during avoidance maneuvers. Others are based on mutilated cadavers picked off of runways, bloodstains on airframes and "things that go thunk in the night." It follows, therefore, that identification is often unreliable. Of the 932 strikes analyzed, only 487 (52 percent) resulted in *some sort of identification.* These words are chosen carefully since the second most reported bird (27 percent) is the ever popular "small bird." You won't find this "species" in any field guide nor will you find the infamous "large bird" which is involved in 10 percent of the strikes. Gulls are Navy aircraft's public enemy number one as they are involved in 31 percent of the strikes. It is rather an underwhelming finding that the military service whose mission it is to control the seas mostly runs its planes into the most ubiquitous seabird. The rest of the strikes are spread out among 13 other kinds of birds ranging in size from tiny sparrows to rather substantial vultures. How does a lay person identify a bird? When the strike is routine, do the best you can. For significant strikes (death, injury, engine damage, emergency landing etc.) a more exact identification is highly desirable. Any pattern of recurring strikes should also be treated as significant. A field guide to birds may be very useful. If necessary, microscopic examination of individual parts of feathers by experts can be arranged. Just call your local field division of Naval Facilities Engineering Command for details on this exciting offer. Two percent of the strikes involved bats. Non-winged mammals also occasionally collide with planes. There is nothing quite like a 150-pound deer sprinting across the runway at 0500 just as you hit the refusal speed point to get your adrenaline going. The gnashing of teeth can usually be heard all the way back in the tower and this is why NORTHDIV wants to call its bird strike analysis data-GNAASH, the Global Navy Aircraft-Animal Strike Hazard.

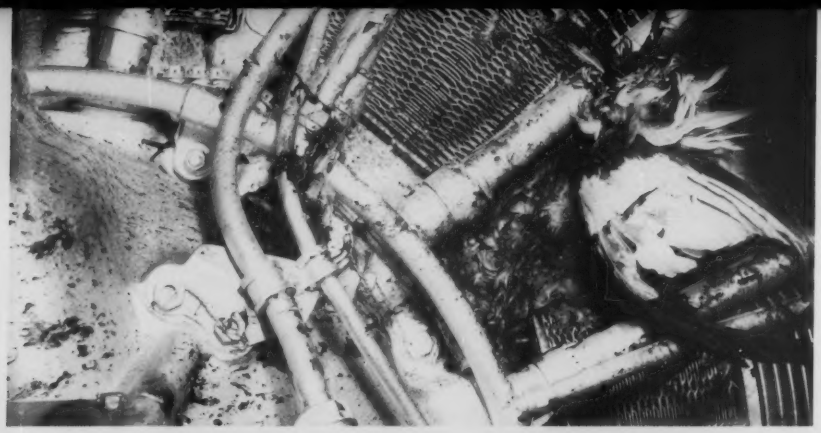
The real points to take away from all of this are:

- Almost anything that flies and some things that don't can strike an aircraft.
- Identification of offending critters is tenuous, but important. The more biologists know about bird strikes, the better prepared they will be to help you prevent them.
- Big birds are the most dangerous. Just remember this formula: big bird = big bang = big hole in plane.
- Gulls cause a high percentage of the problems.

You've all heard about "a man for all seasons," well there is also a bird for all seasons. In other words, there are birds available to run into aircraft year-round. But woe unto the pilot who underestimates the fall migration. In 1981, 34 percent of all strikes occurred in September and October. The range for each of the other 10 months was 3-9 percent. In 1982, the September-October period produced about 27 percent of all the strikes with March (the spring migration period) following in significance with 10 percent of the strikes.

Waterfowl are especially dangerous. They travel in large flocks; they are heavy (windshield smashers) and they fly at very high altitudes. How high do they fly? Ask the pilot of an Israeli El Al flight which struck a bird at an incredible 37,000 feet.

A wise man once said that we could make a bird-proof aircraft, but it would probably be too heavy to get off the ground. Which aircraft are the notorious bird strikers? The P-3 Orions are in a class by themselves. Of different types of



aircraft involved in the 932 strikes, P-3s accounted for 270 (20 percent). Why does one type of aircraft account for almost one-third of the strikes? This may be partially due to the large number of hours flown by patrol aircraft and/or their requirement for prolonged low-level flight over water where birds may be plentiful. Another contributing factor, according to some, is that since P-3s are relatively quiet, they may "sneak up" on birds.

Next comes the attack aircraft with the A-6E Intruder accounting for 88 strikes (nine percent). A-7Es and A-4Ms each account for another three percent of the strikes. Birds can't avoid fast moving aircraft nearly as efficiently as they can slower aircraft. Compounding the danger is the fact that the faster the aircraft flies, the more damage occurs when it hits something. Furthermore, risk to the jet engines is greater than to piston engines. Whereas propellers are efficient bird shredders, jets ingest birds whole usually causing very serious damage.

The other significant group of bird strikes are the trainers. The T-44A and the TA-4J each account for six percent of the strikes followed by the T-2C at three percent. The UC-12B was also involved in three percent of the strikes. Patrol, attack and training aircraft don't have a monopoly on bird strikes, however, as another 71 types of aircraft each expe-

rienced at least one bird strike. To better understand which aircraft are most likely to incur bird strikes, we also compared the total strikes to the total of hours flown. The P-3s, our number one bird striker, flew over 600,000 hours and were involved in over 270 strikes or approximately 4.5 strikes per 10,000 hours. A few other planes had even higher rates. These were the A-6 (5.8), T-44 (5.1), T-38 (4.8) and F-8(4.6). Statistically, the plane least involved with birds was the T-34 with a rather terrific nine bird strikes in over 33,000 hours (.2). Some other infrequently involved aircraft were the F-18 (.5); the T-28 (.6); the C-1 (.7).

In civilian aviation, most of the collisions occur during takeoff (30 percent) and landing (41 percent) — in other words around the airports. As might be expected, a high percentage of Navy strikes also occur during takeoff (13 percent) and landing (12 percent). The most dangerous phase of flight statistically, however is low level flight (20 percent). Another 17 percent of bird strikes occur during final approach to landing, while missed approaches and touch and go's account for 15 percent. Keep in mind that very few planes are completely safe from bird strikes. A Vickers Viscount lost its tail to whistling swans while operating at high altitude over Baltimore in 1962, killing all 17 people aboard.

How do the bird strikes shake out geographically? In the eastern part the United States, bird strike activity "parallels the parallels." The activities serviced by Northern Division, Naval Facilities Engineering Command (includes Chesapeake Division) have the fewest bird strikes (15 percent) and SouthDiv activities have the most (32 percent). Perhaps NorthDiv activities do better because of colder climates and a correspondingly shorter period of bird activity. The coast from Florida to Texas experiences significant bird activity all through the winter. Atlantic Division falls between geographically and in terms of bird strikes (17 percent). Of course, a closer look would be required to substantiate the relationship between latitude and bird strikes since Atlantic Division's territory includes Europe and the Caribbean. Perhaps the real key might be found in an analysis of missions flown out of each locale.

Nevertheless, it is obvious that many species are migratory and that bird strikes will move south for the winter along with the birds. West coast activities chip in with 26 percent of the strikes while the Pacific completes the picture with the remaining 11 percent.

The moral of the story is this . . . be attentive to birds at all times, but be doubly attentive near airports, during all low-level and high-speed flight especially during migration.

We also took a look at bird strikes as a function of time of day. Day flight accounted for 74 percent and night flight only 23 percent. The remainder occurred at dawn, dusk or were unreported. The inference is clear. Most strikes occur when visual sighting of birds is possible. Aircrews should keep themselves aware of the very real hazards imposed by bird activity in and around airfields and preflight briefings should include bird avoidance/strike considerations.

What are the consequences of these bird strikes? The most drastic and feared result of a midair collision between Navy aircraft and birds is death. In 1982 an Air Force Thunderbird lost his life in a crash caused by a collision with a gull during an airshow. Miraculously only one other fatal injury occurred during the report period. But there have been some close calls. In April 1982, Capt. Andrew Allen, USMC took a gull in the face at 500 mph. (See August 1982 Approach article "Out of sight . . . but not of mind!") Although temporarily voiceless and blinded in one eye, Allen successfully returned the F-4 to Beaufort, S.C. Capt. Allen lived because his visor was lowered. All in all, our pilots have come through these 932 strikes in pretty good shape, but the machinery took a beating. In fact, 31 percent of all aircraft involved in bird strikes incurred damage.

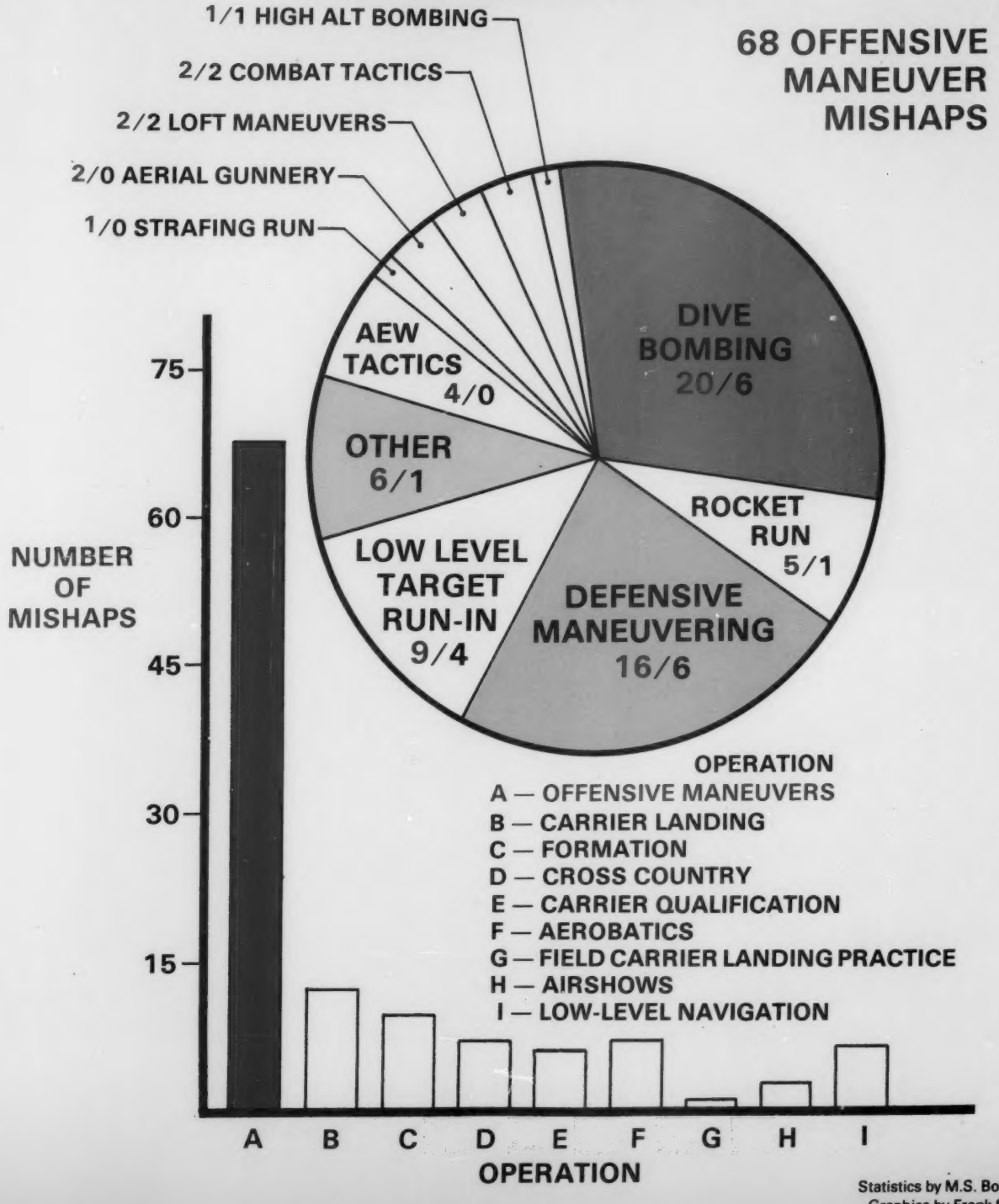
The negative aspect of bird strikes on mission accomplishment is significant. No points are given for muddling on after a bird strike. In fact, stated in its simplest terms in a Naval Aviation Bird Strike Hazard Report last June, after an A-7E hit a turkey buzzard during low-level training flight near NAS Cecil Field, Fla. "A bird strike is a bird strike." Even if it is a small bird and a light "thunk," the pilot has to assume the worst. Abort the mission and immediately return to base. So when you strike a bird the game may not be over, but it sure is suspended.

This concludes part one. In part two you can follow in the footsteps of Cal Rodgers, the first man to fly across the United States. Cal was aslo the first ever to die as the result of a bird strike when a gull became jammed in the controls of his Wright Brothers plane. ◄

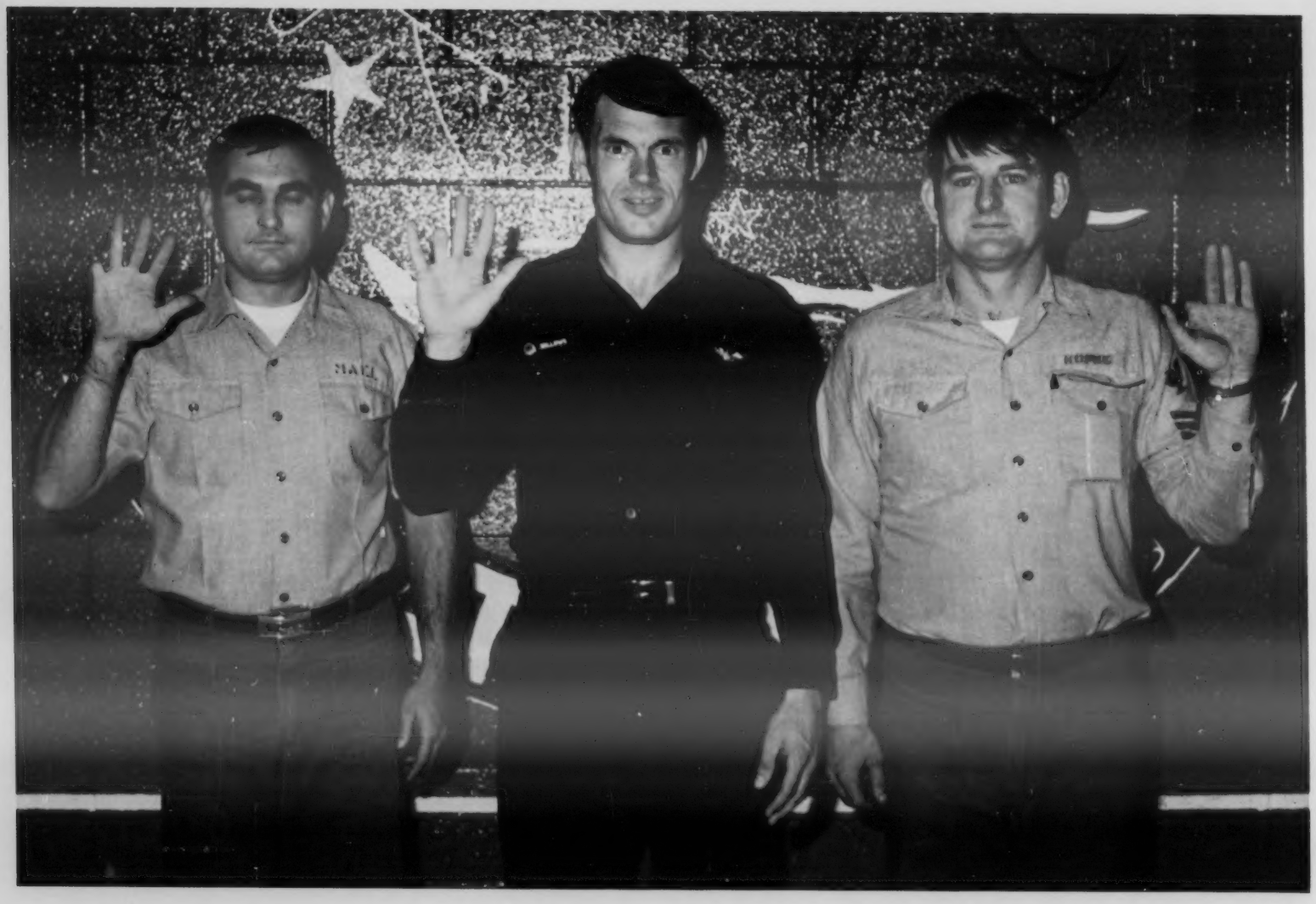
ATTACK

ALL NAVY and MARINE
HIGH RISK FLIGHT REGIMES
CLASS A MISHAPS/PILOT CAUSAL FACTOR

CALENDAR YEARS 1977 — 82



Statistics by M.S. Borowsky
Graphics by Frank Smith



We do solemnly swear to be safe!

Naval Safety Center
NAS Norfolk, Virginia

Poster idea contributed by PATRON 93.